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ABSTRACT

This curriculum guide was developed to help trade and industrial education teachers (especially in Louisiana) improve their graphic arts course. The guide provides a course description and content outline for a 1-year course to be taught in grades 10-12. Preliminary matter includes a course flowchart, prerequisite, goals and objectives, time frame, and course outline. The guide contains 20 units that cover the following topics: orientation and safety; the graphic arts industry; type styles; planning, design, and layout; composition methods; proofing type composition; copy preparation for process photography; process camera and darkroom procedures; letterpress image carriers; letterpress imposition; letterpress image transfer; lithographic imposition; lithographic image carriers; lithographic image transfer; screen printing; finishing and binding; pulp and paper manufacturing; printing ink; graphic arts career opportunities; and photography. Each unit teaching guide consists of objectives, topics, student activities, teacher activities, and resources. A list of audiovisual sources and a 7-item bibliography are included. (KC)

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BASIC GRAPHIC ARTS

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Bulletin 1777

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THOMAS G. CLAUSEN, Ph.D.

State Superintendent

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BASIC GRAPHIC ARTS

BULLETIN 1777

Dr. Thomas Eppler
Project Director

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Department of Industrial Education and Technology
Natchitoches, Louisiana 71457

June 30, 1986

FOREWORD

This publication is a guide for the improvement of instruction in Industrial Arts Education in Louisiana. It should be of benefit to industrial arts teachers, supervisors, counselors, and administrators. These operational guidelines will help local administrators, teacher educators, and industrial arts teachers determine the extent to which their programs are meeting the needs of our youth. Industrial Arts Education Programs must be organized to meet the needs of all students.

A constant concern for educators is the construction and revision of curriculum. Industry and technology are the core of industrial arts instruction. Both are constantly changing; therefore, curriculum and instruction must change in order to provide students a realistic and accurate understanding of industry and its function in our complex technological society.

Thomas G. Clausen

THOMAS G. CLAUSEN, Ph.D.
STATE SUPERINTENDENT OF EDUCATION

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Elaine Webb, Ed.D.
Assistant Superintendent
Office of Vocational Education

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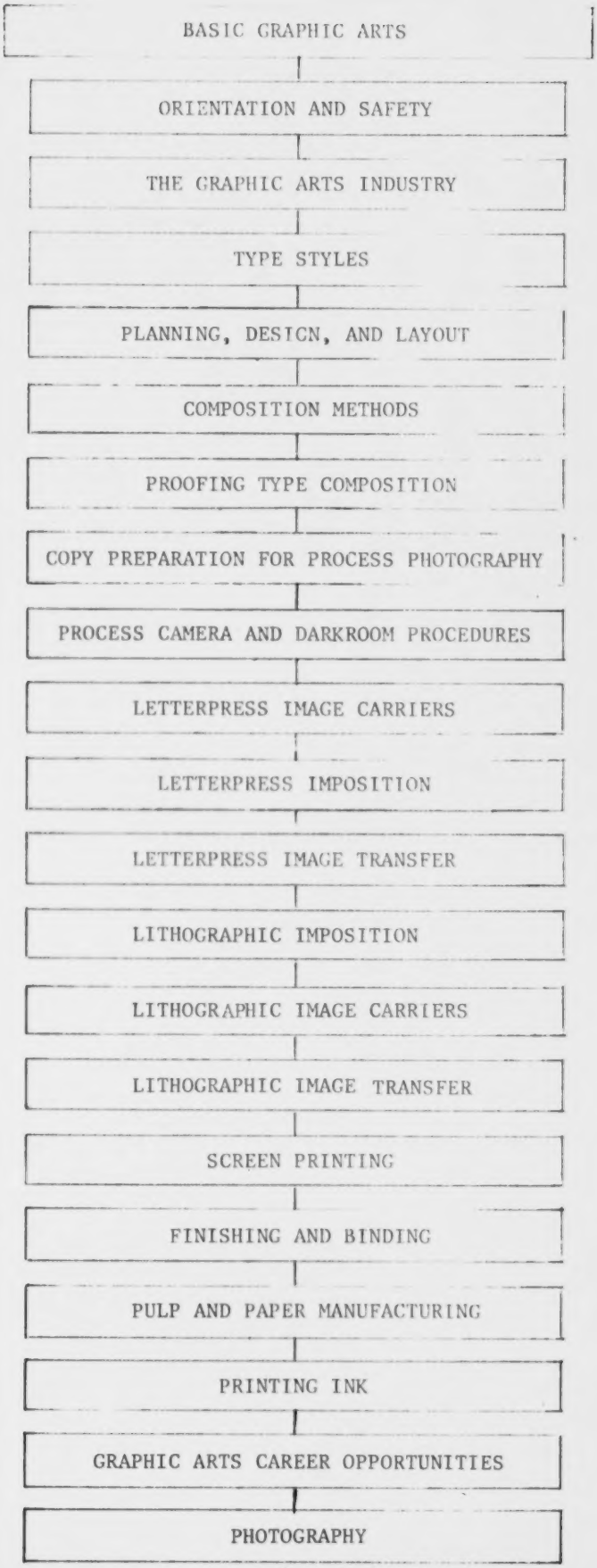
BASIC GRAPHIC ARTS
ORIENTATION AND SAFETY
THE GRAPHIC ARTS INDUSTRY
TYPE STYLES
PLANNING, DESIGN, AND LAYOUT
COMPOSITION METHODS
PROOFING TYPE COMPOSITION
COPY PREPARATION FOR PROCESS PHOTOGRAPHY
PROCESS CAMERA AND DARKROOM PROCEDURES
LETTERPRESS IMAGE CARRIERS
LETTERPRESS IMPOSITION
LETTERPRESS IMAGE TRANSFER
LITHOGRAPHIC IMPOSITION
LITHOGRAPHIC IMAGE CARRIERS
LITHOGRAPHIC IMAGE TRANSFER
SCREEN PRINTING
FINISHING AND BINDING
PULP AND PAPER MANUFACTURING
PRINTING INK
GRAPHIC ARTS CAREER OPPORTUNITIES
PHOTOGRAPHY

Title:

Basic Graphic Arts

Course Description:

Basic Graphic Arts is designed to give an introduction to the technical information and skills necessary for a career in graphic arts. Students will have opportunities to design, plan, and complete various projects and jobs in the graphic arts field.

Target Grade Levels:

Grades 10 - 12

Prerequisite:

General Industrial Arts

Course Goals:

In this course, the student will become acquainted with the broad field of graphic arts. The student will be exposed to the technical information and skills needed to pursue a career in the graphic arts industry. Career opportunities will be stressed.

Course Objectives:

Upon satisfactory completion of this course the student will be able to:

1. Define the broad areas of graphic arts.
2. Illustrate the basic concepts of layout and design as related to graphic arts.
3. Identify the several methods of type composition.
4. Discuss the several aspects of photoconversion.
5. Be familiar with the various image-carrier devices.
6. Describe the various methods of image transfer.
7. Prepare flats and plates for offset printing.
8. Operate the small offset press.
9. Recognize finishing and binding methods.
10. Value and appreciate the contribution graphic arts has made to civilization and as a career alternative.

Introduction:

Graphic arts is a form of communication. In fact, the subject is also referred to as graphic communications. It includes all arts and processes that give information by means of images printed on surfaces.

Products of the industry include such diversified items as books, magazines, newspapers, letterheads, business cards, paper money, labels, and many others. Compared to all United States industries, graphic arts ranks high in both employee payroll and product value.

Stable employment is furnished for the countless thousands of employees who produce the graphic arts products. Numerous opportunities exist for skilled production and managerial employees. Through completion of this course, students should be aware of career opportunities in graphic arts, and they should be prepared for more specialized training through advanced courses or apprenticeship programs.

This curriculum guide has been prepared for use in an up-to-date, well-equipped graphic arts laboratory. Since considerable variations in facilities and equipment may exist in actual school settings where graphic arts is taught, teachers may have to adjust the guide to fit their situations. Some of the units may need to be taught as essentially informational topics with little or no laboratory experiences. If a laboratory has no letterpress equipment, then the units dealing with letterpress printing can be shortened and those dealing with offset lithography can be expanded.

The sequencing of units is a sound one. However, flexibility exists if there are reasons for changing the order of presentation. It is suggested that the order of presentation be maintained through the first six units.

The unit on photography has been prepared as an optional one. Time constraints preclude covering everything that might be desirable in an introductory course. However, if a school laboratory has the facilities and equipment for teaching this unit, the teacher should feel free to adjust the suggested time schedule in order to include it.

Suggested Time Allowment:

The suggested time frame for Basic Graphic Arts is 180 days.

TIME FRAME

Unit I	Orientation and Safety	5 Hours
Unit II	The Graphic Arts Industry	5 Hours
Unit III	Type Styles	8 Hours
Unit IV	Planning, Design, and Layout	12 Hours
Unit V	Composition Methods	15 Hours
Unit VI	Proofing Type Composition	5 Hours
Unit VII	Copy Preparation for Process Photography	10 Hours
Unit VIII	Process Camera and Darkroom Procedures	15 Hours
Unit IX	Letterpress Image Carriers	5 Hours
Unit X	Letterpress Imposition	5 Hours
Unit XI	Letterpress Image Transfer	15 Hours
Unit XII	Lithographic Imposition (Stripping)	15 Hours
Unit XIII	Lithographic Image Carriers	15 Hours
Unit XIV	Lithographic Image Transfer	15 Hours
Unit XV	Screen Printing	10 Hours
Unit XVI	Finishing and Binding	10 Hours
Unit XVII	Pulp and Paper Manufacturing	5 Hours
Unit XVIII	Printing Ink	5 Hours
Unit XIX	Graphic Arts Career Opportunities	5 Hours
Unit XX	Photography (Optional--Time required)	20 Hours
	Total	180 Hours

BASIC GRAPHIC ARTS

A COURSE OUTLINE

I. ORIENTATION AND SAFETY

A. Course Requirements and Grading System

B. Safety

1. State rules
2. Parish rules
3. School rules
4. Classroom rules (including basic safety)

II. THE GRAPHIC ARTS INDUSTRY

A. Introduction to Graphic Arts

1. Definition of graphic arts
2. Purpose of graphic arts
3. Influence of graphic arts
   a. Information explosion
   b. Cultural needs for graphic arts products
   c. Importance of graphic arts products

B. The Scope of Graphic Arts

1. Where graphic arts exist
2. Business enterprises
   a. Commercial printing plants
   b. Newspapers
   c. Paper manufacturers
   d. Ink manufacturers
   e. Equipment and chemical manufacturers
3. Production divisions of graphic arts
   a. Design-layout
   b. Copy preparation
   c. Photo-conversion
   d. Image carriers
   e. Image transfer
   f. Finishing and binding
4. Specialty graphic arts business establishments
   a. Creative graphic artist firms
   b. Type-composition houses
   c. Camera and darkroom businesses
   d. Platemakers
   e. Press facilities
   f. Trade binders

C. Cultural Contributions of Graphic Arts

1. Early significant events
   a. Invention of paper
   b. Woodblock printing
   c. Movable nonmetal type
   d. Movable metal type
2. Significant United States events
   a. First printing press
   b. First paper mill
3. The beginning of newspapers
4. People and machines
   a. Linotype--Otmar Mergenthaler
   b. Metal printing press
   c. Papermaking machine

D. Size of the Industry

1. Graphic arts--a changing industry
   a. Through products
   b. Through methods of production
2. Employment
   a. Stable
   b. Over one million employees
   c. Need for qualified management personnel and skilled production workers
   d. Wages and salaries
3. Industry growth

E. Graphic Arts Printing Process

1. Letterpress process
   a. Image-transfer principle
   b. Percentage of printed products by letterpress
   c. Historical aspects
   d. Common products
2. Lithography
   a. Image-transfer principle
   b. Percentage of printed products by lithography
   c. Historical aspects
   d. Common products
3. Gravure
   a. Image-transfer principle
   b. Historical aspects
   c. Percentage of printed products by gravure
   d. Common products
4. Screen
   a. Image-transfer principle
   b. Percentage of printed products by screen
   c. Historical aspects
   d. Common products

5. Photographic
    a. Image-transfer principle
    b. Historical highlights
    c. Primary use
6. Electrostatic
    a. Basic principle
    b. Historical aspects
    c. Primary use

III. TYPE STYLES

A. Introduction to Typefaces

1. Typefaces and communication
2. Psychology of a typeface
3. Kinds of letters
    a. Lowercase
    b. Uppercase
4. Choosing a typeface
    a. Legibility
    b. Readability
    c. Appropriateness
    d. Reproducibility
    e. Practicality

B. Evolution of the Alphabet

1. Early visual communication
2. Egyptian hieroglyphics
3. The alphabet

C. Characteristics of Typefaces

1. Typeface parts
    a. Thick strokes
    b. Thin strokes
    c. Serifs
    d. Ascender
    e. Counter
    f. Bowl
    g. Descender
2. Distinguishing features
    a. Serifs
    b. Typeface weight
3. A type font
    a. Definition
    b. Subdivision of type fonts
    c. Examples of type fonts within the school laboratory
4. A type series
    a. Definition
    b. Size ranges common to type series
    c. Series available in the school laboratory

5. A type family
   a. Definition
   b. Families of type available in the school laboratory
6. Italic typefaces

E. Classification of Type faces

1. Text type
   a. Distinguishing characteristics
   b. Uses
2. Roman type
   a. Distinguishing characteristics
   b. Uses
3. Sans serif type
   a. Distinguishing characteristics
   b. Uses
4. Square serif type
   a. Distinguishing characteristics
   b. Uses
5. Script type
   a. Distinguishing characteristics
   b. Uses
6. Novelty type
   a. Distinguishing characteristics
   b. Uses

IV. PLANNING, DESIGN, AND LAYOUT

A. Introduction to Planning, Design, and Layout

1. Definition of layout
2. Value of good planning
3. Layout sequence
   a. Thumbnail sketches
   b. Rough layout
   c. Comprehensive layout
4. Needed tools and supplies

B. Measurement Systems

1. The point system
   a. Comparison to the inch system
   b. Points and picas
   c. The line gauge
2. Common type sizes
3. The metric system

C. Design Principles

1. Page proportion
2. Balance
3. Contrast
4. Unity
5. Rhythm

D. Color Principles

1. The color wheel
   a. Primary colors
   b. Secondary colors
   c. Intermediate colors
2. Color harmony
3. Psychology of color

E. Thumbnail Sketches

1. Purposes
2. Method of preparation

F. The Rough Layout

1. Purposes
2. Method of preparation

G. The Comprehensive Layout

1. Purposes
2. Steps of preparation
3. The overlay sheet
4. The mechanical layout

H. Page and Signature Layout

1. Margins
2. Dummy layout
3. Copyfitting

V. TYPE COMPOSITION METHODS

A. Introduction to Type Composition

1. Definition of type composition and typesetting
2. Methods of type composition
   a. Hot composition
   b. Cold composition
3. Quality and speed in typesetting
4. Historical development
   a. Foundry type composition
   b. Mechanical composition--the linotype
   c. Photographic composition
5. Word and information processing
   a. Word processing interface with typesetting
   b. Facsimile transmission and reception

B. Foundry Type Composition

1. Past and present uses
2. California job case
3. Spacing materials
    a. Word spacing materials
    b. Linespacing materials
4. Composing stick and galley

C. Hot-Metal Type Composition

1. Past and present rules
2. Line casting
    a. Linotype
    b. Intertype
    c. Ludlow
3. Single character casting
4. Line space casting

D. Impact Type Composition

1. Past and present uses
2. Impact composition machines
    a. Regular typewriter
    b. Interchangeable typeface typewriters
    c. Impact composers
    d. Word processing equipment
    e. Impact lettering machines

E. Dry-Transfer and Hand-Mechanical Type Composition

1. Past and present uses
2. Dry-transfer materials
3. Hand-mechanical type equipment

F. Photographic Type Composition

1. Principle
2. Four generations
    a. Mechanical
    b. Electromechanical
    c. Electronic
    d. Laser imaging
3. Categories of phototypesetters
    a. Display
    b. Body
4. Using phototypesetters
5. Processing photocomposition
    a. Stabilization paper
    b. Regular photographic paper

C. Kinds of Copy

1. Line copy
   a. Type matter
   b. Inked drawings
   c. Scratch board
   d. Block print
   e. Screentints
2. Continuous tone copy
3, Combination of line and continuous tone

D. Copy Considerations

1. Size of copy
   a. Results of enlargement
   b. Results of reduction
2. Protecting copy
   a. Purpose
   b. Overlay sheet
   c. Handling
3. Checking the final copy
   a. Proofread
   b. Accurate placement of elements

E. Cropping, Scaling, and Register Marks

1. Cropping
   a. Selecting the appropriate area
   b. Making crop marks on the copy
   c. Cropping a photograph by the overlay technique
   d. Marking the appropriate size
2. Scaling copy
   a. Proportioned rule technique
   b. Mathematical formula technique
   c. Diagonal line technique
3. Specifying reduction and enlargement
   a. Actual size
   b. Percentage
4. Register marks
   a. Purpose
   b. Kinds of marks
   c. Placement of marks

F. Making the Paste-up

1. Purpose of making paste-up
2. Determining the size of the base
   a. Determine the final desired printed size
   b. Establish the reduction or enlargement
   c. Cut the base to size

3. Securing the elements for the paste-up
    a. Kinds of elements
        (1) Type matter
        (2) Illustrations
    b. Consider enlargement or reduction
4. Treatment of photographs on copy
    a. Block method
    b. Outline method
    c. Prescreened halftone method
5. Attaching the elements
    a. Waxing
    b. Taping
    c. Cementing

C. Notes and Instructions to the Printer

1. Importance of accurate notes and instructions to the printer
2. Personal data
3. Technical data
    a. Size
    b. Special photographic treatment
    c. Kind of paper
    d. Color(s) of ink
    e. Finishing operations
4. Methods of making notes and instructions

VIII. PROCESS CAMERAS AND DARKROOM PROCEDURES

A. Introduction to Process Cameras and Darkroom Procedures

1. Purpose of process cameras
    a. Photograph flat copy
    b. Make precise enlargements and reductions
2. Parts of a camera
    a. Lens
    b. Shutter
    c. Bellows
    d. Camera back
    e. Copyboard
    f. Lights
        (1) Incandescent
        (2) Quartz
        (3) Pulsed xenon

B. Classifications of Process Cameras

1. Gallery camera
2. Darkroom cameras
3. Horizontal cameras
4. Darkroom cameras

G. Electronic Image Generation

1. Electronic image generation computers
2. Third generation equipment
   a. Use of the Cathode Ray Tube (CRT)
   b. Image lines formed by a roster scan
   c. Digitizing of images
   d. Typesetting speed up to 2,000 characters per second
3. Fourth generation equipment
   a. Use of the laser to create images
   b. Type characters, artwork, halftones created
   c. Type sizes available
   d. Electronic publishing

VI. PROOFING TYPE COMPOSITION

A. Introduction to Proofing

1. Proofing procedures
   a. The reading proof
   b. The reproduction proof
2. Importance of proofing

B. Proofing Relief Type

1. Letterpress proof presses
   a. Hand operated
   b. Power operated
   c. Used for reading proofs
   d. Use for reproduction proofs
2. Making reading proofs
   a. Preparing the proof press
   b. Inking the typeform
   c. Positioning the paper
   d. Pulling the proof
   e. Cleaning the typeform
   f. Cleaning the proof press

C. Proofing Photographic Type

1. Proofing and editing terminals
   a. Table and floor models
   b. Functions of a terminal
2. Proofing and editing procedure
   a. Set original phototype
   b. Make electrostatic copies
   c. Proofread the content
   d. Correct errors on screen
   e. Re-proof and correct
   f. Send proofs to customer

D. Proofreading Procedures

1. The proofreader
   a. Responsibilities
   b. Qualifications
2. The copyholder
   a. Responsibilities
   b. Qualifications
3. Proofreader's marks

E. Correcting Type Composition

1. Time and cost involved
2. Foundry type composition
3. Hot-metal type composition
4. Impact type composition
5. Dry-transfer type composition
6. Hand-mechanical type composition
7. Photographic type composition

VII. COPY PREPARATION FOR PROCESS PHOTOGRAPHY

A. Introduction to Copy Preparation

1. Elements of copy
   a. Type matter
   b. Illustrations
2. Purpose of copy preparation
3. Considerations in copy preparation

B. Equipment and Materials for Copy Preparation

1. Background for copy
   a. Color
   b. Weights
   c. Surfaces
   d. Layout sheets
2. Drawing equipment
   a. Board or drawing surfaces
   b. T-square and triangles
   c. Instruments
   d. Rules and scales
   e. Curves
   f. Pencils
      (1) Blue
      (2) Sketching
   g. Inking pens
   h. Paint brushes
   i. Airbrush
3. Attaching elements
   a. Double-surface tape
   b. Waxing machine
   c. Rubber cement

C. Films and Chemicals for Process Photography

1. Structure of film
   a. Base
   b. Emulsion
   c. Overcoat
   d. Antihalation
2. Kinds of film
   a. Panchromatic film
   b. Orthochromatic
   c. Silverless film
3. Handling film
4. Chemicals
   a. Developer
   b. Rinse bath
   c. Fixing solution

D. Darkrooms

1. Equipment
   a. Sinks
   b. Watermixers
   c. Processing trays
   d. Thermometers
   e. Safelights
   f. Graduates, beakers, pails, funnels
   g. Timers
   h. contact printers
   i. Light source
   j. Inspection lights
2. Darkroom arrangements
3. Darkroom cleanliness

E. Safety in the Darkroom

1. Darkness
   a. Become familiar with equipment, materials, and darkroom arrangement
   b. Let eyes become adjusted to darkness
2. Chemicals
   a. May irritate skin
   b. Avoid handling in darkness
   c. Always wash thoroughly after use
3. Moisture
   a. Falls
   b. Electrical shock
4. Chemical storage
   a. Easily reached
   b. Safe containers
5. Electrical equipment
   a. Grounded
   b. Place away from moisture

F. Exposing and Processing a Line Negative

1. Darkroom preparation
   a. Clean work surfaces and camera
   b. Sinks and chemicals preparation
   c. Tray arrangement
      (1) Developer
      (2) Stop bath
      (3) Fixer
      (4) Wash
2. Camera Adjustments
   a. Time
   b. Lens
   c. Image size
3. Placement of copy on copyboard
4. Film location
5. Film development
   a. Automatic film processing
   b. Hand processing
      (1) Use of gray scale
      (2) Step-by-step procedure

G. Exposing and Processing a Halftone Negative

1. Nature of continuous-tone copy
   a. Highlights
   b. Shadows
   c. Middle tones
2. Methods for screening continuous-tone copy
   a. Contact screen
   b. Glass screen
   c. Autoscreen film
3. Computing halftone negative exposures
   a. Trial and error
   b. Halftone negative computer
4. Camera adjustment
   a. Time
   b. Lens
   c. Image size
5. Copy placement
6. Film and screen placement
7. Main exposure
8. Flash exposure
9. Film development

H. Contact Printing

1. Purpose
2. Equipment
   a. Vacuum printing frame
   b. Point source light

3. Materials
    a. Contact film
    b. Duplicating film
    c. Orthochromatic film
    d. Contact paper
4. Negative and film placement
5. Exposure
6. Development

IX. LETTERPRESS IMAGE CARRIERS

A. Introduction to Letterpress Image Carriers

1. Basic kinds of image carriers
2. Materials used for relief image carriers
3. Shape of relief image carriers
4. Historical highlights

B. Safety and Letterpress Carriers

C. Photoengravings

1. Description
2. Use
3. Making a photoengraving

D. Rigid Photopolymer Relief Plates

1. Description
2. Use
3. Making a rigid photopolymer plate

E. Flexible Photopolymer Relief Plates

1. Description
2. Use
3. Making a flexible photopolymer plate

F. Stereotypes

1. Description
2. Use
3. Making a stereotype

G. Electrotypes

1. Description
2. Use
3. Making an electrotype

H. Flexographic printing plates

1. Description

2. Use
3. Making a flexographic printing plate

I. Rubber Stamps

1. Description
2. Use
3. Making a rubber stamp

J. Linoleum Blocks

1. Description
2. Use
3. Making a linoleum block

X. LETTERPRESS IMPOSITION AND LOCKUP

A. Introduction to Letterpress Imposition and Lockup

1. Definitions
2. Purpose

B. Tools and Equipment

1. Imposing stone or table
2. Chases
3. Furniture and reglets
4. Quoins and keys
5. Planer block

C. Methods of Locking Type Forms

1. Chaser method
2. Furniture-within-furniture method

D. Procedure for Locking Form

1. Placement of form in chase
2. Filling in space between typeform and chase
3. Placement of quoins
4. Tightening quoins
5. Testing for loose lines
6. Planing typeform
7. Retightening quoins

XI. LETTERPRESS IMAGE TRANSFER

A. Introduction to Letterpress Image Transfer

1. The platen press
   a. Operating principle
   b. Some common presses
   c. Typical products
   d. Operating speeds

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2. The cylinder press
    a. Operating principle
    b. Some common presses
    c. Typical products
    d. Operating speeds
3. The rotary press
    a. Operating principle
    b. Some common presses
    c. Typical products
    d. Operating speeds

B. Safety with Letterpress Presses (Stress Safety on Presses in Your Laboratory)

C. Platen Press Operation

1. Platen Press Operation
    a. Platen
    b. Ink fountain
    c. Ink disk
    d. Platen guard
    e. Feed board
    f. Delivery board
    g. Impression lever
    h. Counter
2. Platen press preparation
    a. Platen packing
    b. Inking
    c. Placing the chase in the press
    d. Paper positioning
    e. Gauge pin placement
    f. Gripper placement
3. Make ready
4. Feeding the press
5. Platen press cleanup
    a. Removing and washing the typeform
    b. Washing the ink disk
    c. Washing the ink rollers
    d. Wiping down the press
6. Press lubrication
    a. Kinds of oil and grease used
    b. Oiland grease press charts
    c. Lubrication procedures

XII. LITHOGRAPHIC IMPOSITION (STRIPPING)

A. Introduction to Lithographic Imposition

1. Terminology
    a. Imposition
    b. Stripping
    c. Flat
    d. Masking sheet

2. Platemaking procedure
   a. Masking sheet over sensitive plate
   b. Light through negative
   c. Masking sheet blocks light

B. Equipment and Materials of the Stripper

1. Equipment
   a. Light table or line-up table
   b. T-squares and triangles
   c. Rule
   d. Magnifiers
   e. Knives
   f. Scissors
   g. Brushes
2. Materials
   a. Masking sheet
   b. Opaque solution
   c. Stripping tape

C. Preparation and Layout for Stripping

1. Preparation for stripping
   a. Examine negatives
      (1) Overall visual inspection
      (2) Magnification
   b. Consult original layout
      (1) Location of image on printed product
      (2) Size of paper
      (3) Treatment of product after printing
      (4) Placement of multiple negatives on the sheet
   c. Location of the lead edge
      (1) Accurate placement of negative
      (2) Masking sheet lead edge corresponds to printed sheet lead edge
      (3) Marked on some masking sheets
   d. Identifying gripper margins
      (1) Define
      (2) No image in gripper margin
   e. Locating sheet margins
      (1) Show position where located on masking sheet
      (2) Lead edge provides reference point
2. Layout for stripping
   a. Mark sheet margins
   b. Mark image location

D. Completing the Flat

1. Attach negatives to masking sheet
2. Open the image areas on flat
3. Opaque negatives

XIII. LITHOGRAPHIC IMAGE CARRIERS

A. Introduction to Lithographic Image Carriers

1. Principle of lithography
2. Importance of platemaker's work

B. Kinds of Plates

1. Direct image
2. Pre-sensitized plates
3. Electrostatic plates
4. Deep-etch plates

C. Exposing Pre-sensitized Plates

1. Plate material
   a. Base materials
      (1) Metal
      (2) Plastic
      (3) Paper
   b. Coating
      (1) Light-sensitive
      (2) Safe in subdued light
2. Exposure frame (platemaker)
   a. Vacuum frame
   b. Light source
      (1) Mercury vapor
      (2) Pulsed xenon
      (3) Metal halide
3. Plate exposure
   a. Platemaker's sensitivity guide
   b. Plate exposure procedure

D. Processing Pre-sensitized Plates
(Instructor should prepare a handout showing step-by-step procedure from manufacturer's instructions for plates to be used.)

E. Direct-Image Plates

1. Nature of direct-image plates
   a. Paper-base
   b. Water-resistant coating
   c. Accepts grease image
   d. Image applied mechanically to the surface
2. Image-producing methods
   a. Typewriter
   b. Pencil and pen
   c. Ball-point pen
   d. Drawing

F. Correcting, Preserving, and Storing Plates

1. Making corrections
   a. Deletions
   b. Additions
2. Preserving plates
   a. Purpose
      (1) Later use
      (2) Reuse
   b. Gum arabic used
3. Storing plates

XIV. LITHOGRAPHIC IMAGE TRANSFER

A. Introduction to Offset Lithography Presswork

1. Offset lithography press systems
   a. Feeding system
   b. Cylinder system (printing)
   c. Dampening system
   d. Inking system
   e. Delivery system
2. Press designs
   a. Three-cylinder design
   b. Two-cylinder design
   c. Four-cylinder design

B. Offset Lithography Duplicators and Presses

1. Office duplicators
   a. Designed for simple and fast operation
   b. Table-top and floor models available
   c. Single lever control
   d. Program control
2. Form and job duplicators
   a. Web-fed multiple units
   b. Single and multiple color units
3. Commercial presses
   a. Used for high quality
   b. Single and multiple color units
   c. Publication presses
   d. High speed, multi-unit, and complex
4. Lithographic proof presses

C. Safety with the Offset Lithography Duplicator/Press
(Teach thorough safety lesson pertaining to presses in your laboratory.)

D. The Offset Lithography Duplicator/Press

1. Feeding system controls
   a. Speed-control level
   b. Left and right jogger control knobs
   c. Air-blow control
   d. Vacuum control

e. Back paper feed control
f. Paper platform handwheel
g. Left and right paper stack side guides
h. Paper stack back guide

2. Cylinder system controls
   a. Handwheel
   b. Manual plate-to-blanket impression control
   c. Vertical positioning control knob
3. Dampening system controls
   a. Dampener fountain roller control knob
   b. Dampener volume control
   c. Form roller control lever
   d. Auxiliary dampener form roller control knob
4. Ink system controls
   a. Ink fountain roller control knob
   b. Ink volume control
   c. Ink fountain manual-control lever
5. Delivery system controls
   a. Delivery sheet stop
   b. Delivery lock release
   c. Delivery paper feed control
   d. Delivery pile handwheel
   e. Delivery rate lowering control
   f. Automatic copy counter
6. Miscellaneous controls and devices
   a. Delivery light
   b. Delivery side guide control knobs
   c. Delivery board
   d. Drive motor switch
   e. Air vacuum pump switch
   f. Paper platform

F. Preparing the Offset Lithography Duplicator/Press

1. Preparing the feeding system
   a. Lowering the paper platform
   b. Setting the paper stack guide
   c. Setting the front paper guides
   d. Adjusting the suction feet
   e. Adjusting the air-blow
   f. Inserting the paper
   g. Adjusting the back and side guides
   h. Raising the paper pile
   i. Adjusting the feedboard and joggers
2. Preparing the delivery system
   a. Raising the delivery board
   b. Adjusting the side guides
   c. Adjusting the back jogging guide
   d. Lowering the pile

3. Preparing the inking system
   a. Inspecting and cleaning the inking rollers
   b. Filling the ink fountain
   c. Adjusting the ink fountain
   d. Adjusting the ink flow
4. Making ready the dampening system
   a. Dampening roller inspection and cleaning
   b. Mixing the fountain solution
   c. Adding the fountain solution
   d. Moistening the dampening rollers

G. Operating the Offset Lithography Duplicator/Press

1. Attaching and securing the plate (image carrier)
2. Starting the duplicator/press
   a. Wipe down the plate
   b. Turn on the power
   c. Lower the dampening roller
   d. Lower the inking rollers
   e. Begin the paper feed
3. Stopping the duplicator/press
   a. Turn off the paper feed
   b. Raise the ink rollers
   c. Raise the dampening roller
   d. Turn off the power
4. Printing position adjustments
   a. Vertical
   b. Horizontal
   c. Diagonal

H. Offset Lithography Duplicator/Press Adjustments

1. Feeding system adjustments
   a. Double-sheet eliminator
   b. Elevator control knob
   c. Printing speed
2. Delivery system adjustments
   a. Delivery rate lowering control
   b. Jogging guides
3. Inking system adjustments
   a. Form rollers
   b. Other ink rollers
4. Dampening system adjustments
   a. Form roller
   b. Oscillator roller
   c. Ductor roller
5. Cylinder system adjustments
   a. Plate-to-blanket impression
   b. Blanket-to-paper impression
6. Blanket installation
   a. Removal of old blanket
   b. Attachment to the lead clamp

c. Attachment to the blanket tail clamp
d. Securing the blanket

I. Lithographic Printing Problems

1. Quality results
   a. How to recognize quality
   b. How to achieve quality
2. Printing problems
   a. How to diagnose a problem
   b. How to solve the problem
3. Common printed sheet problems
   a. Scumming
   b. Dirty background
   c. Too dark
   d. Weak spots
   e. Non-image area filling
   f. Image breakdown while plate is running

J. Cleaning the Offset Lithography Duplicator/Press

1. The dampening system
2. The inking system
3. The cylinder system
4. The total duplicator/press

XV. SCREEN PRINTING

A. Introduction to Screen Printing

1. Principle of operation
2. Different names for the process
3. Historical highlights
4. Products
   a. Two-dimensional
   b. Three-dimensional
   c. Cylindrical objects
5. The three categories of image carriers
   a. Knife-cut film
   b. Photographic
   c. Washout (tusche)

B. Industrial Equipment and Production Methods

1. The various screen principles
   a. Rotary screen
   b. Rocker-type machine
   c. Bottle-printing machine
   d. Flat-bed type machine
2. Printing machines for commercial use
   a. Hand-operated
   b. Flat-bed

c. Cylinder
d. Rotary
e. Specialty

3. Drying equipment
   a. Wood or metal drying racks
   b. Wicket dryers
   c. Drying ovens
   d. Continuous conveyor-belt dryers

C. Screen Printing Equipment for Hand Production

1. Equipment for hand production
   a. Frame
   b. Screen fabric
   c. Squeegee
   d. Film-cutting tools
   e. Drying equipment

D. Safety with Screen Printing Equipment and Materials (Teach thorough safety lesson pertaining to equipment in your laboratory.)

E. Building a Screen Printing Press

1. Frame construction
   a. Commonly used woods
   b. Screen and image size ratio
   c. Construction procedure
2. Base construction
   a. Commonly used materials
   b. Screen and base size ratio
   c. Construction procedure
3. Attaching the screen fabric
   a. Various methods possible
   b. Cutting the fabric to correct size
   c. Stretching and securing the fabric
4. Taping the frame

F. Artwork for Screen Printing

1. Hand-cut film
2. Direct photosensitive screens
3. Indirect photographic screen film
4. Paper stencil
5. Washout screens

G. Lacquer-Soluble Hand-Prepared Film

1. Description
2. Cutting the film
   a. Securing the artwork
   b. Securing the lacquer film

c. Cutting procedures
d. Removing the film from image areas
e. Replacing film if corrections are needed
f. Safety-knives

3. Fabric preparation
   a. Mechanical treatment
   b. Degreasing
4. Adhering the film
   a. Preparing the screen
   b. Lacquer film placement
   c. Applying the adhering liquid
   d. Absorbing the excess adhering liquid
   e. Removing the backing sheet
   f. Safety-ventilation
5. Removing film from the screen
   a. Preparation and supplies needed
   b. Dissolving the lacquer
   c. Safety--ventilation and fire

H. Water-Soluble Hand-Prepared Film

1. Description
2. Cutting the film
   a. Securing the artwork
   b. Securing the water-soluble film
   c. Cutting procedures
   d. Removing the film from image areas
   e. Replacing film if corrections are needed
   f. Safety--knives
3. Fabric preparation
4. Adhering the film
   a. Preparing the screen
   b. Water-soluble film placement
   c. Applying the adhering liquid
   d. Absorbing the excess adhering liquid
   e. Removing the backing sheet
   f. Safety--ventilation
5. Removing film from the screen
   a. Preparation and supplies needed
   b. Dissolving the water-soluble film
   c. Safety--ventilation and fire

I. Masking the Non-Printing Areas

1. The purpose or screen masking
2. Paper masking
   a. Top-paper masking
   b. Bottom-paper masking
3. Liquid masking
   a. Brush application
   b. Squeegee application
4. Tape masking

J. The Screen Printing Operation

1. Screen printing ink
   a. Water-base
   b. Oil base
   c. Synthetic enamel
   d. Lacquer-base
   e. Special formulations
2. Printing procedure
   a. Attaching the frame to the base
   b. Securing the paper guides
   c. Applying the ink
   d. Pulling the squeegee
   e. Making the flood stroke
   f. Removing the printed copy
   g. Printing multiple copies
3. Printing on special materials
   a. Thick, flat objects
   b. Cylindrical objects

K. Paper Stencil and Washout Screens

1. The paper stencil
   a. Preparation of the stencil
   b. Printing with the stencil
   c. Cleanup procedures
2. The washout screen
   a. Selection/preparation of the copy
   b. Filling in the image area
   c. Masking the non-printing area
   d. Removing the liquid tusche
   e. The printing operation
   f. Cleaning the screen

XVI. FINISHING AND BINDING

A. Introduction to Finishing and Binding

1. Purpose of finishing and binding
2. Historical development

B. Safety in Finishing and Binding
(Teach thorough safety lesson pertaining to all finishing and binding equipment in your laboratory.)

C. Finishing Methods

1. Cutting and trimming
2. Folding
3. Scoring
4. Perforating
5. Gathering
6. Collating

7. Punching and drilling
8. Die-cutting
9. Hot stamping
10. Laminating

D. Paper Cutting

1. Safety
2. Planning for cutting
    a. Determining needed press sheets
    b. Determining the number of stock sheets
    c. Making a cutting chart
3. The power paper cutter parts and purposes
    a. Table
    b. Backgauge
    c. Backgauge handwheel
    d. Backgauge indicator
    e. Clamp
    f. Clamp control
    g. Cutting stick
    h. Knife
    i. Knife control buttons
    j. Light switch
    k. Power switch
    l. Pressure gauge and controls
4. Paper-cutter operation
    a. Backgauge adjustment
    b. Positioning the paper
    c. Clamping the paper
    d. Cutting the paper
    e. Removing the cut paper and/or trimmings

E. Basic Binding Methods

1. Mechanical binding methods
    a. Spiral wire
    b. Plastic cylinder
2. Loose-leaf bindings
    a. Ring binder
    b. Post binding
    c. Base-and-prong
    d. Friction
3. Wire staple binding
    a. Saddle-wire
    b. Side wire
4. Perfect binding
5. Sewn bindings--soft or hard cover
    a. Saddle sewing
    b. Flat sewing
    c. Signature to signature sewing

F. Soft-Cover Binding Procedures

1. Plastic-cylinder binding
   a. Materials needed
   b. Operating the punch
   c. Operating the plastic cylinder opening device
   d. Attaching the sheets and attaching the plastic cylinder
2. Post binding
   a. Materials needed
   b. Operating the bar cutter or broad shears
   c. Fastening the binder's board to the binding cloth
   d. Constructing the library corner
   e. Constructing the nicked corner
   f. Operating the hot-stamping press
   g. Punching holes
   h. Assembling the book
3. Saddle-wire stitching
   a. Materials needed
   b. Folding the sheets by hand or with a paper folder
   c. Gathering the signatures
   d. Operating the power stitcher
   e. Trimming the booklets
4. Side-wire stitching
   a. Materials needed
   b. Gathering the sheets or signatures
   c. Operating the side-wire stitching machine
   d. Applying the book cloth to the backbone
   e. Trimming the book
5. Padding
   a. Materials needed
   b. Gathering the sheets
   c. Preparing the binding
   d. Applying the adhesive
   e. Trimming the pads

XVII. PULP AND PAPER MANUFACTURING

A. Introduction to Pulp and Paper Manufacturing

1. The paper manufacturing industry
2. Paper products
3. Historical highlights
4. Paper and raw materials

B. Pulp Manufacturing
1. Pulpwood
   a. Kinds of trees
   b. Transportation and handling
2. Debarking
3. Chipping

4. Pulping
5. Bleaching
6. Beating and refining

C. Paper Manufacturing

1. Methods of manufacturing
   a. The fourdrinier
   b. The cylinder
   c. The inverform
2. Forming the paper
3. Adding the watermark
4. Water removal and drying
5. Finishing
   a. Inspecting
   b. Sheeting
   c. Special finishing
   d. Packaging

D. Kinds, Weights, and Sizes of Paper

1. Printing paper classification
   a. Bond
   b. Book
   c. Bristol
   d. Cover
   e. Ledger
   f. Offset
   g. Text
   h. Newsprint
   i. Duplicator
   j. Mimeograph
2. Basic weights and sizes of paper
3. Recycled paper

E. Buying and Finding Cost of Paper

1. Packaging methods for printing papers
2. Determining cost of paper

XVIII. PRINTING INK

A. Ink Manufacture

B. Vehicles

1. Terms
2. Varnishes
3. Synthetic oils
4. Resins
5. Solvents

C. Vehicle Drying

1. Absorption drying
2. Oxidation and polymerization
3. Resin-solvent drying
4. Moisture-set drying
5. Resin-oil drying
6. Cold-set drying

D. Pigments

1. Natural and synthetic organic pigments
2. Daylight fluorescent pigments
3. Permanency of pigments

E. Ink Compounds and Additives

F. Characteristics of Inks for Different Printing Papers

1. Letterpress
2. Lithography
3. Gravure
4. Screen

G. Ink Problems

1. Setoff
2. Improper drying
3. Chalking
4. Sticking

H. Ink Tests

I. Ordering Inks

J. Ink Care

XIX. GRAPHIC ARTS CAREER OPPORTUNITIES

A. Introduction to Careers in Graphic Arts

1. The graphic arts industry
   a. Opportunities
   b. Challenges
2. Qualifications
   a. Apprenticeship
   b. Journeyman
   c. How to achieve needed qualifications
3. Earnings and working conditions
   a. Hourly pay
   b. Work-week length
   c. Stability of employment
4. Employment outlook
   a. Today's opportunities

b. Opportunities in 5 to 10 years
c. Operating a personal business

B. Production Preparation

1. Design and layout
   a. Area of design origination
   b. People need artistic talent
   c. Task
2. Composition
   a. Compositor--a talented person
   b. Training necessary
3. Photography
   a. Continuous-tone photography needs
   b. High-contrast photography needs
4. Image carriers
   a. People with a knowledge of chemistry desirable
   b. New materials within this area

C. Production of Printed Materials

1. Image transfer
   a. Area by definition
   b. Personnel qualifications
   c. Working conditions
   d. Kinds and sizes of equipment available
2. Finishing and binding
   a. Finishing operations
   b. Personnel qualifications for the finishing area
   c. Binding operations
   d. Skills necessary for the binder

D. Management and Sales and Opportunities

1. Management and sales personnel
   a. Essential ingredients of all business enterprises
   b. Must be specialist in change
2. Management people
   a. Qualifications
   b. Complex work
3. Sales personnel
   a. Area of many challenges
   b. Qualities of a good salesperson

E. Pulp and Paper Manufacturing Opportunities

1. Pulp and paper manufacturing opportunities
   a. Engineering
   b. Scientific areas
   c. Research areas
   d. Management, business, and legal areas
2. Opportunities within the plant operations
   a. Production workers
   b. Maintenance personnel
   c. Semi-skilled personnel

XX. PHOTOGRAPHY

A. Introduction to Photography

1. Origin of photography
   a. Man's desire to record events
   b. Photography invented
2. Uses of photography
3. Avocational and occupational implications of photography

B. The Camera

1. Simple cameras
   a. Box camera
   b. Cartridge cameras
2. Twin-lens reflex
3. Single-lens reflex cameras
4. Press cameras
5. View cameras

C. Photographic Films

1. Kinds of film
2. Structure of film
3. Latent image
4. Film speeds
5. Grain
6. Film sizes
7. Loading film

D. Making the Exposure

1. Image areas of photograph
   a. Highlights
   b. Shadows
   c. Middletones
2. Film speeds
   a. ASA
   b. Fast
   c. Medium
   d. Slow
3. Light
   a. Natural
   b. Artificial
   c. Natural light measurement with meter
4. Apertures
   a. Sizes--f/numbers
   b. Depth of field (depth of focus)
5. Shutter speeds
   a. Range of speeds
   b. Influence on motion
6. Holding the camera
   a. Hand-held techniques
   b. Use of tripod

E. Film Processing

1. Latent image
   a. Exposed silver halides
   b. Becomes visible upon development
2. Development chemicals
   a. Developer
   b. Stop-bath
   c. Fixers
   d. Wash
3. Developing film
   a. Done in total darkness
      (1) Tray development
      (2) Tank development
   b. Equipment
      (1) Tanks
      (2) Thermometer
      (3) Graduate
      (4) Funnel
      (5) Timer
4. Loading roll film
5. Processing film
   a. Follow manufacturer recommendations
   b. Primary factors
      (1) Development time
      (2) Chemical temperature
      (3) Agitation

c. Procedure
(Prepare handout showing step-by-step procedure for processing film using materials and equipment in your laboratory.)

F. Photographic Papers

1. Bases
2. Emulsions
3. Paper finishes

G. Photographic Printing

1. Contact printing
2. Contact printing devices
   a. Printing frame
   b. Contact printer
3. Making the contact print
4. Principles of projection printing
5. Enlargers
   a. Light source
   b. Negative carrier
   c. Lens
   d. Base
6. Making projection print

H. Finishing and Mounting Prints

1. Purpose of finishing
2. Drying
3. Mounting photographs

UNIT I: ORIENTATION AND SAFETY 5 Hours

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
The student should be able to:	I. Orientation and Safety			
understand the course requirements and grading system.	A. Course Requirements and Grading System		Discuss grading procedures.	Parish Teacher Handbook
identify the state, parish, school, and classroom rules and regulations that apply to the graphic arts laboratory.	B. Safety 1. State rules 2. School rules 3. Parish rules 4. Classroom rules (basic safety)	Tour the laboratory	Discuss safety in the laboratory.	Book 4, pp. 366-374
			Show a film on safety.	
		Draw a chart listing the various classes of fire extinguishers and their uses.	Demonstrate the proper use of fire extinguishers.	
		List the locations of fire extinguishers and alarms.	Have a demonstration by the local fire department on safety.	Handbook for Vocational Industrial Education Shop Teachers, Vocational Instruction
		Practice evacuation of the laboratory--classroom.		
		Make a list of any safety hazards in the laboratory--classroom.		
			Organize a clean-up chart and explain duties.	

UNIT II: THE GRAPHIC ARTS INDUSTRY 5 Hours

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
The student should be able to: define the term graphic arts. list the primary purpose of graphic arts. name the different ways that graphic arts has affected society.	II. The Graphic Arts Industry A. Introduction of Graphic Arts 1. Definition of graphic arts 2. Purpose of graphic arts 3. Influence of graphic arts a. Information explosion b. Cultural needs for graphic arts products c. Importance of graphic arts products	Prepare a list of all products and materials that are produced by the graphic arts industry in their classroom.	Have students collect various forms of graphic arts. Give reading assignment.	Book 5, p. 1 Newspapers, magazines, etc. Book 5, pp. 1-14
identify several types of business enterprises that make up the total graphic arts industry.	B. The Scope of Graphic Arts 1. Where graphic arts exist 2. Business enterprises a. Commercial printing plants b. Newspapers c. Paper manufacturers d. Ink manufacturers e. Equipment and chemical manufacturers	Take a field trip to local newspaper office or printing office.	Have students visit local newspaper or printing company.	Book 5, p. 3 Commercial Printing Company
name the six production phases of graphic arts.	3. Production divisions of graphic arts a. Design-layout b. Copy preparation c. Photo-conversion d. Image carriers e. Image transfer f. Finishing and binding	Draw a flow chart of the plant. List the six production phases and show where they are located and why.	Have students locate the six production phases of graphic arts at the local printing plant.	Book 5, p. 4

UNIT II: THE GRAPHIC ARTS INDUSTRY (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
Contrast the general commercial printer with the several kinds of specialty graphic arts businesses.	4. Specialty graphic arts business establishments a. Creative graphic artist firms b. Type-composition houses c. Camera and darkroom businesses d. Platemakers e. Press facilities f. Trade binders			Book 5, p. 6
	C. Cultural contributions of Graphic Arts 1. Early significant events a. Invention of paper b. Woodblock printing c. Movable nonmetal type d. Movable metal type 2. Significant United States events a. First printing press b. First paper mill 3. The beginning of newspapers 4. People and machines a. Linotype-Otmar Mergenthaler b. Metal printing press c. Papermaking machine	Do a short research paper on the impact of printing upon society.	Show film	Book 5, p. 6 "Story of Printing" Instructional Media Center (VIR), Univ. of Texas, Austin, P. O. Drawer W, Univ. Station, Austin, TX 78712 Book 5, p. 7
	D. Size of the Industry			Book 5, p. 9

UNIT II: THE GRAPHIC ARTS INDUSTRY (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	1. Graphic arts--a changing industry a. Through products b. Through methods of production 2. Employment a. Stable b. Over one million employees c. Need for qualified management personnel and skilled production workers d. Wages and salaries 3. Industry growth	Research the opportunity for employment in graphic arts.	Have a graphic arts professional come as a guest speaker.	Local employment office "Occupational Handbook." "U.S. Industrial Outlook."
	E. Graphic Arts Printing Processes 1. Letterpress process a. Image-transfer principle b. Percentage of printed products by letterpress c. Historical aspects d. Common products	Sketch the basic concept underlying each of the six image transfer methods.	Arrange examples of the six image transfer methods for students.	Book 5, p. 10
	2. Lithography a. Image-transfer principle b. Percentage of printed products by lithography c. Historical aspects d. Common products	Choose any process of the graphic arts industry listed under Item "E" and give an oral report as to its beginning and how it has evolved.	Have students research one of the processes in graphic arts (E) and give an oral report as to how this particular process has evolved. Have students explain how each process works.	Book 5, p. 11 Book 4, p. 88 Book 5, p. 100 Book 5, p. 12
	3. Gravure a. Image-transfer principle b. Historical aspects			

UNIT II: THE GRAPHIC ARTS INDUSTRY (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	c. Percentage of printed products by gravure d. Common products 4. Screen a. Image-transfer principle b. Percentage of printed products by screen c. Historical aspects d. Common products 5. Photographic a. Image-transfer principle b. Historical highlights c. Primary use 6. Electrostatic a. Basic principle b. Historical aspects c. Primary use			Book 5, p. 13

UNIT III: TYPE STYLES 8 Hours

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
The students should be able to:	III. TYPE STYLES			Book 5, p. 17
appraise the value of typefaces.	A. Introduction to typefaces 1. Typefaces and communication 2. Psychology of a typeface 3. Kinds of letters a. Lowercase b. Uppercase		Obtain printed examples of several different type styles for students.	
name and describe the five important factors to consider when choosing a typeface.	4. Choosing a typeface a. Legibility b. Readability c. Appropriateness d. Reproducibility e. Practicality			Book 5, p. 18
describe early (before the alphabet) visual methods of communication.	B. Evolution of the Alphabet 1. Early visual communication 2. Egyptian hieroglyphics 3. The alphabet	Prepare a report on the development of the alphabet.		
name the importance of a well designed typeface.	C. Characteristics of Typefaces 1. Typeface parts a. Thick strokes b. Thin strokes c. Serifs d. Ascender e. Counter f. Bowl g. Descender		Demonstrate the characteristics of typefaces on the chalk board.	Book 5, p. 23
distinguish among the several parts of a typeface.	2. Distinguishing features a. Serifs b. Typeface weight			Book 5, p. 24

UNIT III: TYPE STYLES (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
distinguish among the terms font, series, and family used in relationship to type.	3. A type font a. Definition b. Subdivisions type font c. Examples of type fonts within the school laboratory			Book 4, p. 25 Book 6, p. 39 Book 3, p. 24
	4. A type series a. Definition b. Size ranges common to type series c. Series available in school laboratory	Obtain a type catalog and review it. Does it contain an example of a type font? If so, name the kind and style of type. Also, locate a family of type. Write down the name of each specific kind of type on the family.	Obtain a type catalog for this exercise.	Book 5, p. 25
	5. A type family a. Definition b. Families of type available in the school laboratory			
	6. Italic typefaces			
	E. Classification of Type Faces	Locate printed examples of each of the six typeface classifications. Obtain different sizes and specific typefaces within each classification.	Provide outdated or unwanted publications.	Book 4, p. 26 Book 5, p. 27
	1. Text type a. Distinguishing characteristics b. Uses			
	2. Roman type a. Distinguishing characteristics b. Uses			
	3. Sans serif type a. Distinguishing characteristics b. Uses			
	4. Square serif type a. Distinguishing characteristics			

UNIT III: TYPE STYLES (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	B. Uses 5. Script type a. Distinguishing characteristics b. Uses c. Novelty type a. Distinguishing characteristics b. Uses			

UNIT IV: PLANNING, DESIGN, AND LAYOUT 12 Hours

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
The student should be able to:	IV. PLANNING, DESIGN, AND LAYOUT			
discuss the value of good planning. list the normal sequence in the preparation of a complete set of layouts assemble tools and supplies that are appropriate to use during the preparation of two-dimensional layouts.	A. Introduction to Planning, Design, and Layout 1. Definition of layout 2. Value of good planning 3. Layout sequence a. Thumbnail sketches b. Rough layout c. Comprehensive layout 4. Needed tools and supplies	Make a complete set of layouts for a poster advertising a future sporting event in the school. Prepare the pre-layout planning form, four thumbnail sketches, one rough layout, and one comprehensive layout with the overlay sheet.	Provide necessary materials for layouts.	Book 5, p. 37 Book 6, p. 15 Book 3, p. 38 Book 4, p. 25
use the point system to measure type size, line length, and line spacing. accurately use a line gauge for both pica and inch measure. describe the importance of properly utilizing two-dimensional space. describe and use the metric measurement system where appropriate.	B. Measurement Systems 1. The point system a. Comparison to the inch system b. Points and picas c. The line gauge 2. Common type sizes 3. The metric system			Book 5, p. 40 Book 4, p. 28 Book 3, p. 10
demonstrate a knowledge of design principles.	C. Design Principles 1. Page proportion 2. Balance 3. Contrast 4. Unity 5. Rhythm	Obtain and analyze several printed brochures. Were the five principles of design used? What areas could have been improved?	Provide the brochures for the students if necessary.	Book 3, p. 47

UNIT IV: PLANNING, DESIGN, AND LAYOUT (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
distinguish among the several pigment colors known as primary, secondary, and intermediate. design multi-color graphic products.	D. Color Principles 1. Color wheel a. Primary colors b. Secondary colors c. Intermediate colors 2. Color harmony 3. Psychology of color	Prepare a color wheel. Use water paints and mix them to match primary, secondary, and intermediate colors. Show examples of the four common color harmonies.	Provide water paints.	Book 5, p. 52
list the three primary purposes of thumbnail sketches. prepare a set of thumbnail sketches based upon some given content.	E. Thumbnail Sketches 1. Purpose 2. Method of preparation			Book 5, p. 55 Book 3, p. 39
name the three purposes of a rough layout. prepare a rough layout based upon a selection or combination of thumbnail sketches according to an acceptable standard.	F. The Rough Layout 1. Purposes 2. Method of preparation	Produce a comprehensive layout based on a prepared rough layout. According to acceptable standards as established by the instructor.	Explain the purposes of a rough layout. Have students prepare a rough layout based on a selection of thumbnail sketches.	Book 5, p. 58 Book 4, p. 33 Book 3, p. 38
write the major purposes of the comprehensive layout.	G. The Comprehensive Layout 1. Purposes 2. Steps of preparation 3. The overlay sheet 4. The mechanical layout			Book 4, p. 35 Book 5, p. 59
establish page margins for a single page and for two facing pages in the book. prepare a dummy layout for a booklet of eight or more pages. copyfit a given amount of copy using a specific type kind, size, and style.	H. Page and Signature Layout 1. Margins 2. Dummy layout 3. Copyfitting	Prepare a dummy for a 16-page booklet. Identify each page by number. Locate and rule in the margins for pages 1, 8, 9, and 16.		Book 5, p. 63 Book 5, p. 64 Book 5, p. 65 Book 4, p. 40

UNIT V. COMPOSITION METHODS	15 Hours			
OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
The student should be able to:	V. COMPOSITION METHODS			
clarify the meaning of the words "type composition" and "typesetting."	A. Introduction to Type Composition 1. Definition of type composition and typesetting 2. Methods of type composition a. Hot composition b. Cold composition 3. Quality and speed in typesetting 4. Historical development a. Foundry type composition b. Mechanical composition--the linotype c. Photographic composition 5. Word and information processing a. Word processing interface with typesetting b. Facsimile transmission and reception	Compare several books and describe the method of composition used to typeset each printed book. Compare the quality and readability.	Lecture.	Book 5, p. 73 Book 3, p. 101 Book 4, p. 44
summarize the historical highlights of the graphic arts area known as type composition.		Compose and properly justify three to six lines of foundry type.	Give demonstration.	
recognize the major value of word processing within the typesetting area.				
define the terms, such as the California job case, composing stick, galley, and other terms associated directly with foundry type composition.	B. Foundry Type Composition 1. Past and present uses 2. California job case 3. Spacing materials a. Word spacing materials b. Line spacing materials	Compose several lines of foundry type from any given copy. Use various sizes of type and carefully justify each line.	Distribute to each student a copy of the layout of the California Job Case for use during the composition process.	Book 5, p. 76 Book 4, p. 47 Book 3, p. 11

UNIT V. COMPOSITION METHODS (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	4. Composing stick and galley			
recognize hot-metal composition equipment. name the three different categories of hot-metal composition.	C. Hot-Metal Composition 1. Past and present uses 2. Line casting a. Linotype b. Intertype c. Ludlow 3. Single character casting 4. Line space casting			Book 5, p. 81
recognize impact type composition and the machines which are used to produce impact typesetting.	D. Impact Type Composition 1. Past and present uses 2. Impact composition machines a. Regular typewriter b. Interchangeable typeface typewriters c. Impact composers d. Word processing equipment e. Impact lettering machines	Using a typewriter, compose several paragraphs flush left and flush right. Type or compose several lines to practice extending or reducing the length of lines.	Demonstrate this technique for students.	Book 5, p. 83 Book 4, pp. 44, 60 & 72
recognize and use dry-transfer type composition.	E. Dry-Transfer and Hand-Mechanical Type Composition 1. Past and present uses 2. Dry-transfer materials 3. Hand-mechanical equipment	Compose some headlines using the dry-transfer, hand-mechanical, and photographic type composition methods. Compare the results and quality of each.		Book 5, p. 88

UNIT V: TYPE COMPOSITION METHODS (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
recognize and know the use of photographic composition. describe the four generations of photographic typesetting. distinguish between display and text photographic composition. operate a common brand of display photographic composition machine.	F. Photographic Type Composition 1. Principle 2. Four generations a. Mechanical b. Electromechanical 3. Categories of phototypesetters a. Display b. Body 4. Using phototypesetters		Display photographic copy materials.	Book 5, p. 90
	5. Processing photocomposition a. Stabilization paper b. Regular photographic paper	Use a phototypesetting machine to typeset one to two pages of typewritten manuscript. Determine the parameters before beginning to keyboard the type characters.		
recognize and describe third generation typesetting equipment.	G. Electronic Image Generation 1. Electronic image generation computers 2. Third generation equipment a. Use of the Cathode Ray Tube (CRT) b. Image lines formed by a roster scan c. Digitizing of images d. Typesetting speed up to 2,000 characters per second	Draw and label the Cathode Ray Tube.	Explain how the CRT works.	Book 5, p. 96 Book 4, p. 93
recognize and describe fourth generation typesetting equipment.	3. Fourth Generation Equipment	Explain how third and fourth generation equipment differ.	Discuss the laser and scanner patterns in fourth generation equipment.	Book 4, p. 97 Book 5, p. 98

UNIT V: TYPE COMPOSITION METHODS (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	a. Use of the laser to create images b. Type characters, artwork, halftones created c. Type sizes available d. Electronic publishing			

UNIT VI. PROOFING TYPE COMPOSITION 5 Hours

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
The student should be able to:	VI. PROOFING TYPE COMPOSITION			
summarize the importance of quality proofing and proofreading in relationship to the final printed product.	A. Introduction to Proofing 1. Proofing procedures a. The reading proof b. The reproduction proof 2. Importance of proofing	For a period of one week read each article on the front page of daily newspaper. List errors on a separate sheet under the headings punctuation, delete, insert paragraphing, position, spacing style of type, and miscellaneous. Report on your findings.	Provide newspapers for students. Group students.	Book 5, p. 105 Book 3, p. 15
recognize and briefly describe letterpress proof presses that are used for reading proofs, reproduction proofs, and four-color proofs.	B. Proofing Relief Type 1. Letterpress proof presses a. Hand operated b. Power operated c. Used for reading proofs d. Use for reproduction proofs			Book 5, p. 106
perform the tasks associated with making reading proofs from relief images.	2. Making reading proofs a. Preparing the proof press b. Inking the typeform c. Inking the typeform d. Pulling the proof e. Cleaning the typeform f. Cleaning the proof press			Book 5, p. 107 Book 4, p. 105
recognize and briefly describe an electronic proofing and editing terminal.	C. Proofing Photographic Type 1. Proofing and editing terminals a. Table and floor models b. Functions of a terminal		Lecture and discussion.	Book 5, p. 109

UNIT VI: PROOFING TYPE COMPOSITION (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	2. Proofing and editing procedure a. Set original phototype b. Make electrostatic copies c. Proofread the content d. Correct errors on screen e. Reproof and correct f. Send proofs to customer			Book 5, p. 111
perform the tasks associated with proofing and editing phototypesetting. explain the responsiblities of the copyholder and the proofreader.	D. Proofreading Procedures 1. The proofreader a. Responsibilities b. Qualifications 2. The copyholder a. Responsibilities b. Qualifications	Visit a local newspaper. Spend some time seeing how the copyholder and proofreader work together. Observe how the proofreader marks and what happens to the proofs when he is finished.	Arrange for a visit to a local newspaper.	Book 5, p. 111
use the common proofreading marks.	3. Proofreader's marks	Mark errors on proof. Learn the proofreader's marks.	Prepare copy to be proofread. Test students on their knowledge of proofreader's marks.	Book 3, p. 16 Book 4, p. 105 Book 6, p. 53
perform the task of correcting the following kinds of type composition: foundry type, hot metal, impact, dry-transfer, hand-mechanical, and photographic.	E. Correcting Type Composition 1. Time and cost involved 2. Foundry type composition 3. Hot-metal type composition 4. Impact type composition 5. Dry-transfer type composition 6. Hand-mechanical type composition 7. Photographic type composition	Make type corrections.	Demonstrate correction techniques.	Book 5, p. 112

UNIT VII: COPY PREPARATION FOR PROCESS PHOTOGRAPHY 10 Hours

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
The student should be able to:	VII. COPY PREPARATION FOR PROCESS PHOTOGRAPHY	Collect examples of type matter and illustrations.	Lecture and discussion.	Book 5, p. 117
describe the two major elements of a piece of copy (type matter and illustrations).	A. Introduction to Copy Preparation 1. Elements of copy a. Type matter b. Illustrations 2. Purpose of copy preparation 3. Considerations in copy preparation			
identify the typical equipment required by an artist to produce a variety of kinds of copy.	B. Equipment and Materials for Copy Preparation 1. Background for copy a. Color b. Weights c. Surfaces d. Layout sheets			Book 5, p. 118
select the appropriate material and equipment to produce a specific kind of effect.	2. Drawing equipment a. Board or drawing surfaces b. T-square and triangles c. Instruments d. Rules and scales e. Curves f. Pencils (1) Blue (2) Sketching g. Inking pens h. Paint brushes i. Airbrush	Mount paper on drawing boards and demonstrate the use and knowledge of drawing equipment.	Demonstrate the use of drawing equipment.	Book 5, p. 119

UNIT VII: COPY PREPARATION FOR PROCESS PHOTOGRAPHY (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	3. Attaching elements a. Double-surface tape b. Waxing machine c. Rubber cement			Book 5, p. 120
distinguish clearly between line copy and continuous-tone copy.	C. Kinds of Copy 1. Size of copy a. Type matter b. Inked drawings c. Scratch board d. Block print e. Screen tints 2. Continuous tone copy 3. Combination of line and continuous tone	Collected printed mateials that show various kinds of preparation. Tell how the copy was prepared for printing.	Discuss the difference between line copy and continuous-tone copy.	Book 5, p. 212 Book 4, p. 113
describe the results of enlarging and reducing copy.	D. Copy Considerations 1. Size of copy a. Results of enlargement b. Results of reduction			Book 5, p. 128
identify and use appropriate techniques for protecting copy.	2. Protecting copy a. Purpose b. Overlay sheet c. Handling			
systematically and accurately check copy prior to photography.	3. Checking the final copy a. Proofread b. Accurate placement of elements			
determine the areas of photographs to be cropped.	E. Cropping, Scaling, and Register Marks 1. Cropping a. Selecting the appropriate area	Provide necessary material for student activity. Solve problems involving scaling copy.		Book 5, p. 130 Book 4, p. 113 Book 6, p. 51

UNIT VIII. PROCESS CAMERA AND DARKROOM PROCEDURES 15 Hours

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
The student should be able to:	VII. PROCESS CAMERA AND DARKROOM PROCEDURES			Book 5, p. 143
describe the purpose of a process camera.	A. Introduction to Process Cameras and Darkroom Procedures 1. Purpose of process cameras a. Photograph flat copy b. Make precise enlargements and reductions	Examine the process camera in the laboratory. Identify and explain how each part works.	Give a demonstration and identify each part. Obtain DCA Education Products Transparencies GA-17, A Horizontal Process Camera and GA-51, A Vertical Process Camera.	DCA Educational Products, 424 Valley Road, Warrington, PA 18976
identify the various parts of a process camera.	2. Parts of a camera a. Lens b. Shutter c. Bellows d. Camera back e. Copyboard f. Lights (1) Incandescant (2) Quartz (3) Pulsed xenon			
distinguish between horizontal and vertical cameras.	B. Classifications of Process Cameras 1. Gallery camera 2. Darkroom cameras 3. Horizontal cameras 4. Dark cameras	List the advantages and disadvantages of both the horizontal and vertical process cameras.	Discussion.	Book 5, p. 146 Book 4, p. 124 Book 3, p. 109
describe the different parts of a piece of film.	C. Films and Chemicals for Process Photography 1. Structure of film a. Base b. Emulsion c. Overcoat d. Antihalation	Draw a cross-section of a piece of film and label the parts.	Discuss the kinds of films available and which is used most often.	Book 5, p. 148

UNIT VIII. PROCESS CAMERA AND DARKROOM PROCEDURES (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
distinguish between panchromatic, orthochromatic, and silverless film.	2. Kinds of film a. Panchromatic film b. Orthochromatic c. Silverless film			
explain the correct procedures for handling film.	3. Handling film		Demonstrate in the lab how to store, stack, and handle film.	Book 4, p. 114
identify the common chemicals and explain their purpose	4. Chemicals a. Developer b. Rinse bath c. Fixing solution			
name common darkroom equipment.	D. Darkrooms 1. Equipment a. Sinks b. Water mixers c. Processing trays d. Thermometers e. Safelights f. Graduates, beakers pails, funnels g. Timers h. Contact printers i. Light source j. Inspection lights			Book 5, p. 151 Book 4, p. 201
describe several darkroom arrangments.	2. Darkroom arrangements			
identify the essential aspects of darkroom cleanliness.	3. Darkroom cleanliness			
	E. Safety in the Darkroom 1. Darkness a. Become familiar with equipment and arrangement b. Let eyes become adjusted to dark		Take students into the darkroom and demonstrate the precautions related to developing film.	Book 5, p. 156

UNIT VIII. PROCESS CAMERA AND DARKROOM PROCEDURES (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	2. Chemicals a. May irritate skin b. Avoid handling in the dark c. Always wash thoroughly 3. Moisture a. Falls b. Electrical shock 4. Chemical storage a. Easily reached b. Safe containers 5. Electrical equipment a. Grounded b. Away from moisture			
prepare the darkroom for making a line negative.	F. Exposing and Processing a Line Negative 1. Darkroom preparation a. Clean work surfaces and cameras b. Sinks and chemicals preparation c. Tray arrangement (1) Developer (2) Stop bath (3) Fixer (4) Wash	Go in the darkroom and set the trays in the right order for film processing.	Have students complete the activity on page 200, unit 55 of text #5.	Book 5, p. 157 Procedures, Book 5, p. 158 Book 4, p. 203
establish camera standards for making line negatives.	2. Camera adjustments a. Time b. Lens c. Image size 3. Placement of copy on copyboard 4. Film location			
expose and develop a line negative.	5. Film development a. Automatic film processing	Expose and develop a line negative.	Check the camera, timer light, etc., and make sure everything is in working order. Provide adequate materials.	DCA Education Products GA-19, GA-56, GA-60

UNIT VIII. PROCESS CAMERA AND DARKROOM PROCEDURES (Continued)

	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	b. Hand processing (1) Use of gray scale (2) Step-by-step procedure			
	G. Exposing and Processing a Halftone Negative 1. Nature of continuous-tone copy a. Highlights b. Shadows c. Middle tones 2. Methods for screening continuous-tone copy a. Contact screen b. Glass screen c. Autoscreen film 3. Computing halftone negative exposures a. Trial and error b. Halftone negative computer 4. Camera adjustment a. Time b. Lens c. Image size 5. Copy placement 6. Film and screen placement 7. Main exposure 8. Flash exposure 9. Film exposure	Obtain several pieces of continuous-tone copy. Calculate the main and flash exposure for each.	Have several examples of continuous-tone copy available Check equipment and materials (chemicals, timers, camera, lights, thermometers). Prepare water to correct temperature ahead of time.	Book 5, p. 169

UNIT VII: COPY PREPARATION FOR PROCESS PHOTOGRAPHY (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
make crop marks, using two different techniques.	b. Making crop marks on the copy c. Cropping a photograph by the overlay technique d. Marking the appropriate size			
accurately scale copy.	2. Scaling copy a. Proportioned rule technique b. Mathematical formula technique c. Diagonal line technique			
	3. Specifying reduction and enlargement a. Actual size b. Percentage			
	4. Register marks a. Purpose b. Kinds of marks c. Placement of marks			
	F. Making the Paste-Up	Prepare four different paste-ups. Try to use several kinds of elements, including display type, typeset copy, line drawings, and continuous-tone copy. Also include the different methods used to attach elements to the base.	Secure the materials used to demonstrate the paste-up technique.	Book 5, p. 133 Book 6, p. 49 Book 3, p. 108 Book 4, p. 117
select correct size and kind of material for the base.	1. Purpose of making paste-up 2. Determining the size of the base 3. Securing the elements for the paste-up a. Kinds of elements (1) Type matter (2) Illustrations b. Consider enlargement			

UNIT VII: COPY PREPARATION FOR PROCESS PHOTOGRAPHY (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	4. Treatment of photographs on copy. a. Block method b. Outline method c. Prescreened halftone method			Book 5, p. 134
satisfactorily attach elements to the paste-up.	5. Attaching the elements a. Waxing b. Taping c. Cementing			
use appropriate techniques for making notes on copy.	C. Notes and Instructions to the Printer 1. Importance of accurate notes and instructions to the printer 2. Personal data 3. Technical data a. Size b. Special photographic treatment c. Kind of paper d. Color(s) of ink e. Finishing operations 4. Methods of making notes and instructions	Fill out a job ticket. Be sure to put notes and instructions. Be complete but brief as possible.	Provide a typical job ticket for students.	Book 5, p. 138

UNIT VIII. PROCESS CAMERA AND DARKROOM PROCEDURES (Continued)

	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
identify common kinds of contact printing methods and applications.	H. Contact Printing 1. Purpose 2. Equipment a. Vacuum printing frame b. Point source light	Typeset two or three words in 24 to 28 point type. Use any available method of typesetting.	Lecture--demonstration. Find examples of contact printing products.	Book 5, p. 176
name typical kinds of equipment and materials used in contact printing.	3. Materials a. Contact film b. Duplicating film c. Orthochromatic film d. Contact paper	Make a film negative, 100 percent size. Using the correct film and procedures, make these words into outline letters.		
make contact negatives and/or positives using the equipment and materials available in the laboratory.	4. Negative and film placement 5. Exposure 6. Development	Prepare both a film negative and a film positive. Proof them on photographic print paper. Determine where improvement could be made.	Demonstrate.	

UNIT IX. LETTERPRESS IMAGE CARRIERS 5 Hours

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
The student should be able to:	IX. LETTERPRESS IMAGE CARRIERS			
name the two major divisions of letterpress image carriers. sketch three basic shapes of relief image carriers.	A. Introduction to Letterpress Image Carriers 1. Basic kinds of image carriers 2. Materials used for relief image carriers 3. Shape of relief image carriers 4. Historical highlights	Obtain a sample of each kind of letterpress image carriers. Mount and build each image carrier to type-high. Proof each image carrier under the same proofing conditions.	Prepare and use a transparency showing the standard shapes of letterpress image carriers.	Book 5, p. 203
	B. Safety and Letterpress		Teach safety appropriate to any plate-making equipment in the lab.	Book 5, p. 206
discuss the procedure of producing a photoengraving.	C. Photoengravings 1. Description 2. Use 3. Making a photoengraving			Book 5, p. 207
describe a photopolymer plate plate and tell how and where it is used. explain the basic process in preparing a photopolymer plate.	D. Rigid Photopolymer Relief Plates 1. Description 2. Use 3. Making a rigid photopolymer plate			Book 5, p. 209
	E. Flexible Photopolymer Relief plates 1. Description 2. Use 3. Making a flexible photopolymer plate			

UNIT IX. LETTERPRESS IMAGE CARRIERS (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
recognize and know the use of stereotypes.	F. Stereotypes 1. Description 2. Use 3. Making stereotype			Book 5, p. 216
recognize an electrotype relief image carrier.	G. Electrotypes 1. Description 2. Use 3. Making an electrotype		Display flat and curved electrotypes for students to see.	
discuss the flexographic printing method.	H. Flexographic printing plates 1. Description 2. Use 3. Making a flexographic printing plate			Book 5, p. 218
recognize and know the basic uses for rubber stamps.	I. Rubber Stamps 1. Description 2. Use 3. Making a rubber stamp	Prepare a rubber stamp. Compose the type, prepare the matrix, vulcanize the rubber, and mount the stamp.	Provide necessary materials for students.	Book 5, p. 223
design, cut, and prepare a linoleum block for use on a platen or cylinder letterpress machine.	J. Linoleum Blocks 1. Description 2. Use 3. Making a linoleum block	Cut a linoleum block. Obtain or draw an illustration, transfer it to the linoleum, cut away the non-image areas, make the block type-high, and proof the image.		Book 5, p. 227

UNIT X. LETTERPRESS IMPOSITION AND LOCKUP 5 Hours

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
The student should be able to:	X. LETTERPRESS IMPOSITION AND LOCKUP			
describe the purpose of letterpress lockup.	A. Introduction to letterpress Imposition and Lockup 1. Definitions 2. Purpose			
recognize and name the primary tools and equipment used to make letterpress lockups.	B. Tools and Equipment 1. Imposing stone or table 2. Chases 3. Furniture and reglets 4. Quoins and keys 5. Planer block	Describe the use of each tool or piece of equipment.	Have the tools and equipment arranged for demonstration.	
lockup typeforms, using both the chaser and furniture-within-furniture lockup techniques.	C. Methods of Locking Type Forms 1. Chaser method 2. Furniture-within-furniture method	Demonstrate for the instructor the methods for making a lockup.	Demonstrate the proper procedure for making lockups, using both method. Have students complete activities 1 and 2.	Book 5, p. 56
	D. Procedure for Locking Form 1. Placement of form in chase 2. Filling space between typeform and chase 3. Placement of quoins 4. Tightening quoins 5. Testing for loose lines 6. Planing typeform 7. Retightening quoins			

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UNIT XI. LETTERPRESS IMAGE TRANSFER 15 Hours

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
The student should be able to:	XI. LETTERPRESS IMAGE TRANSFER			Book 5, p. 251
sketch and recognize the operating principles of each of the three styles of letterpress machines--platen, cylinder, and rotary.	A. Introduction to Letter press Image Transfer 1. The platen press a. Operating principle b. Some common presses c. Typical products d. Operating speeds 2. The cylinder press a. Operating principle b. Some common presses c. Operating speeds d. Typical products 3. The rotary press a. Operating principles b. Some common presses c. Typical products d. Operating speeds	Research the history of each of the press designs and prepare a short paper on each design. Arrange an exhibit for one of your school cabinets.	Unit 80. Lecture, demonstrate.	Book 5, p. 276
	B. Safety with Letterpresses		Review safety for using all letterpress equipment in laboratory.	
identify the parts and uses of a power platen press.	C. Platen Press Operation 1. Platen press parts a. Platen b. Ink fountain c. Ink disk d. Platen guard e. Feed board f. Delivery board g. Impression lever h. Counter	Plan a job to be done on a platen press. Compose and lockup the form correctly. Obtain and cut the paper needed. Print the needed number of items with the platen press. Set up, operate, and clean the press properly.	Suggested projects may include name cards, bookmarks, stationery, and address cards.	Book 5, p. 264

UNIT XI. LETTERPRESS IMAGE TRANSFER (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	2. Platen press preparation a. Platen packing b. Inking c. Placing the chase in the press d. Paper positioning e. Gauge pin placement f. Gripper placement			
perform the process of platen press makeready.	3. Makeready			
operate the power platen press to achieve the desired number of printed copies.	4. Feeding the press			
thoroughly clean a platen press.	5. Platen press cleanup a. Removing and washing the typeform b. Washing the ink disk c. Washing the ink rollers d. Wiping down the press	Demonstrate the cleaning procedure for the instructor.	Provide necessary clean-up materials (solvents and rags).	Book 5. p. 274
lubricate a platen press.	6. Press lubrication a. Kinds of oil and grease used b. Oil and grease press charts c. Lubrication procedures	Lubricate a platen press. Wipe the entire press free from ink, oil, or dirt.		Operator's Manual

UNIT XII. LITHOGRAPHIC IMPOSITION (STRIPPING) 15 Hours

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
The student should be able to:	XII. LITHOGRAPHIC IMPOSITION (STRIPPING)			
use terminology unique to stripping.	A. Introduction to Lithographic Imposition 1. Terminology a. Imposition b. Stripping c. Flat d. Masking sheet 2. Platemaking procedure a. Masking sheet over sensitive plate b. Light through negative c. Masking sheet blocks light	Read assignment and complete the assignment at the end of the chapter.	Demonstrate the use of the flat. Provide the following items: masking sheet, negative, tape, and flat.	Book 5, p. 279 Book 6, p. 78 Book 7, p. 268
identify by correct name the tools and materials used by a stripper.	B. Equipment and Materials of the Stripper 1. Equipment a. Light table or line-up table b. T-squares and triangles c. Rule d. Magnifiers e. Knives f. Scissors g. Brushes	Set up the equipment and demonstrate skill in its use. Mount paper, draw horizontal and vertical lines using the equipment.	Provide the tools listed in "B" of the outline. Clean and organize light table.	Book 5, p. 280
use the tools and materials to assemble a satisfactory flat.	2. Materials a. Masking sheet b. Opaque solutions c. Stripping tape			

UNIT XII. LITHOGRAPHIC IMPOSITION (STRIPPING) (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
be able to accurately lay out a masking sheet for assembling a flat.	C. Preparation and Layout for Stripping 1. Preparation for stripping a. Examine negatives (1) Overall visual inspecition (2) Magnification b. Consult original work (1) Location of image on printed product (2) Size of paper (3) Treatment of product after printing (4) Placement of multiple negatives on the sheet c. Location of the lead edge (1) Accurate placement of negative (2) Masking sheet lead edge (3) Marked on some masking sheets d. Identifying gripper margins (1) Define (2) No image in in gripper margin	Obtain a masking sheet and mark it to show the center mark, plate bend area, lead edge, gripper margin, center line, and press sheet for an 8½ x 11 inch sheet of paper. Prepare a single flat for a one-color job that contains one line negative and two halftone negatives. Attach one halftone using the clear window technique and attach the other halftone by cutting out the window. Proof the flat and inspect results.	Lecture, demonstrate. Collect the following items: line and half-tone negative, magnifying glass, masking sheets, rule, pencil, and tape.	Book 5, p. 287 Transparency G-21 PCA Education Products

UNIT XII. LITHOGRAPHIC IMPOSITION (STRIPPING) (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	e. Locating sheet margins (1) Show position where located (2) Lead edge provides reference point			
	2. Layout for stripping a. Mark sheet margins b. Mark image location			Book 7, p. 228 Book 5, p. 283
attach negatives to masking sheet using either the emulsion side up or emulsion side down method.	D. Completing the Flat 1. Attach negatives to masking tape	Prepare a single flat that will be used to expose offset lithograph plates for a two-color job. Prepare the two masking sheets that will serve as color masks. Punch register the three masking sheets. Make proof for each color.		Book 3, p. 116 Book 7, p. 228 Book 5, p. 295
open the image areas on flat.	2. Open the image areas on flat			
opaque negatives.	3. Opaque negatives			

UNIT XIII. LITHOGRAPHIC IMAGE CARRIERS 15 Hours

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
The student should be able to:	XIII. LITHOGRAPHIC IMAGE CARRIERS			
identify and explain the purpose of the plate in the lithographic printing process.	A. Introduction to Lithographic Image Carriers 1. Principle of lithography 2. Importance of platemakers work	Prepare the printing press/ duplicator to show how a plate is used.	Secure several kinds of plates including direct-image and pre-sensitized ones. Obtain a layout copy, flat, and plate to show the sequence of operations to produce a plate.	Book 5, p. 301 Book 3, pp. 7, 100 Book 7, p. 13
classify and describe the major characteristics of lithographic image carriers.	B. Kinds of Plates 1. Direct image 2. Pre-sensitized plates 3. Electrostatic plates 4. Deep-etch plates			Book 5, p. 302 Book 7, pp. 273-275 Book 3, p. 101
establish proper plate exposure.	C. Exposing Pre-sensitized Plates 1. Plate material a. Base materials (1) Metal (2) Plastic (3) Paper b. Coating (1) Light-sensitive (2) Safe in subdued light 2. Exposure frame (platemaker) a. Vacuum frame b. Light source (1) Mercury vapor	Get a masking sheet and a plate sensitivity guide. Cut several windows in the masking sheet. Tape the sensitivity guide into one of the windows. Place the flat with the sensitivity guide over a plate in the exposure unit and cover up the additional windows. Make an exposure at slightly less time than that presently being used in the laboratory. After the exposure, remove the sensitivity guide and place it in another window. Continue this procedure until all of the windows have been used.	Obtain the following: flat to be used for exposing a plate, pre-sensitized plates, and a platemaker's sensitivity guide (gray scale). Clean and prepare the platemaker.	Book 5, p. 304

UNIT XIV. LITHOGRAPHIC IMAGE TRANSFER 15 Hours

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
The student should be able to:	XIV. LITHOGRAPHIC IMAGE TRANSFER A. Introduction to Offset Lithography Presswork 1. Offset lithography presswork a. Feeding system b. Cylinder system c. Dampening system d. Inking system e. Delivery system 2. Press designs a. Three-cylinder design b. Two-cylinder design c. Four-cylinder design B. Offset Lithography Duplicators and Presses 1. Office duplicators a. Designed for simple and fast operation b. Table-top and floor models c. Single lever d. Program control 2. Form and job duplicators a. Web-fed multiple units b. Single and multiple color units 3. Commercial presses a. Used for high quality		Use transparencies, GA-25, GA-26, GA-27 and GA-79. Show film, "Lithography or Offset Printing." Use transparencies, GA-80, GA-81, GA-82, GA-83, and GA-84. Get brochures to illustrate the many different manufacturers, sizes, and capabilities of machines that are available.	DCA Educational Products Book 5, p. 319 Book 7, pp. 13-14 Graphic Arts Technical Foundation, Inc. 4615 Forbe Avenue Pittsburgh, PA 15213 Book 5, p. 322 Book 7, pp. 231-273 DCA Educational Products

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	b. Single and multiple color units c. Publication presses d. High speed, multi-unit, and complex 4. Lithographic proof presses			
	C. Safety with the Offset Lithography Duplicator/Press (Teach thorough safety lesson pertaining to presses in your laboratory.)	Read and follow all safety rules for each press in the shop.	Develop first-aid procedures for each kind of accident which might occur in the shop.	Book 5, p. 328
identify and discuss the purpose of the feeding system controls for an offset lithography duplicator/press.	D. The Offset Lithography Duplicator/Press 1. Feeding system controls a. Speed-control lever b. Left and right jogger control knobs c. Air-blow control d. Vacuum control e. Back paper feed control f. Paper platform handwheel g. Left and right paper stack side guides h. Paper stack back guide		Use transparencies GA-28 and GA-29.	Book 5, p. 327 DCA Education Products Book 7, pp. 306-307

UNIT XIII. LITHOGRAPHIC IMAGE CARRIERS (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	(2) Pulsed xenon (3) Metal halide 3. Plate exposure a. Platemaker's sensitivity guide b. Plate exposure procedure			
accurately and efficiently process pre-sensitized plates.	D. Processing Pre-sensitized Plates (Instructor should prepare a handout showing step-by-step procedure from manufacturer's instructions for plates to be used.)	Process the plate to determine the best exposure time as recommended by the manufacturer.	Prepare platemaking table or sink. (Exposed plate, sponge, dryer, clamps and chemical)	Book 5, p. 308
prepare direct image plates.	E. Direct-Image Plates 1. Nature of direct-imate plates a. Paper-base b. Water-resistant coating c. Accepts grease image d. Image applied mechanically to the surface 2. Image-producing methods a. Typewriter b. Pencil and pen c. Ball-point pen d. Drawing			Book 5, p. 311 Book 7, pp. 273-275

UNIT XIII. LITHOGRAPHIC IMAGE CARRIERS (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
make simple corrections in pre-sensitized plates. adequately preserve plates for later use on presses. store plates for protection and later reference.	F. Correcting, Preserving, and Storing Plates 1. Making corrections a. Deletions b. Additions 2. Preserving plates a. Purpose (1) Later use (2) Re-use b. Gum arabic used 3. Storing plates	Reading assignment.	Secure the following items: processed plates with errors, deletion fluid, eraser, scratch awl, plate tusche, and gum Arabic. Prepare and organize table or sink where plate work is done.	Book 5, p. 345

UNIT XIV. LITHOGRAPHIC IMAGE TRANSFER (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
identify and discuss the purpose of the cylinder system controls for an offset lithography duplicator/press.	2. Cylinder system controls a. Handwheel b. Manual plate-to-blanket impression control c. Vertical positioning control knob	Reading assignment.		
	3. Dampening system control a. Dampener fountain roller control knob b. Dampener volume control c. Form roller control lever d. Auxiliary dampener form roller control knob	Make the dampening system pressure checks on assigned press.		Book 5, p. 336 Book 6, p. 78 Book 7, pp. 13-14
	4. Ink system controls a. Ink fountain roller control knob b. Ink volume control c. Ink fountain manual-control	Take test.	Prepare a quiz on the control systems on the offset duplicator.	
identify and discuss the purpose of the delivery system controls for an offset lithography duplicator/press.	5. Delivery system controls a. Delivery sheet stop b. Delivery lock release c. Delivery paper feed control d. Delivery pile handwheel			

UNIT XIV. LITHOGRAPHIC IMAGE TRANSFER (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	e. Air vacuum pump switch f. Paper platform 6. Miscellaneous controls a. Delivery light b. Delivery side guide control c. Delivery paper feed control d. Drive motor switch e. Air vacuum pump switch f. Paper platform			
76 perform the process of properly adjusting the feeding system of the offset lithography duplicator/press.	F. Preparing the Offset Lithography Duplicator Press 1. Preparing the feeding system a. Lowering the paper platform b. Setting the paper stack guide c. Setting the front paper guides d. Adjusting the suction feet e. Adjusting the air-blow f. Inserting the paper g. Adjusting the back and side guides	Get 100 sheets each of these different sizes of 20 pound bond paper. These sheets should vary in width as well as length. Make the necessary adjustments on the feeder and delivery system on the offset lithography duplicator/press for each of these paper sizes. Make adjustments accurately enough so that all 100 sheets of each size go flawlessly through the press.	Demonstrate the duplicator/press. Obtain necessary materials.	Book 5, p. 330 Book 6, p. 78

UNIT XIV. LITHOGRAPHIC IMAGE TRANSFER (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	h. Raising the paper pile i. Adjusting the feedboard and joggers			
perform the process of properly adjusting the delivery system of the offset lithography duplicator/press.	2. Preparing the delivery system a. Raising the delivery board b. Adjusting the side guides c. Adjusting the back jogging guide d. Lowering the pile			
ink the duplicator/press.	3. Preparing the inking system a. Inspecting and cleaning the inking rollers b. Filling the ink fountain c. Adjusting the ink foundtain d. Adjusting the ink flow	Prepare the dampening and inking systems of the duplicator press. Make the necessary checks of the dampening rollers, the inking system rollers, and the cylinder system pressure.		
prepare the dampening system of the offset lithography duplicator/press.	4. Making ready the dampening system a. Dampening rollers inspection and cleaning b. Mixing the fountain solution c. Adding the fountain solution d. Moistening the dampening rollers			

UNIT XIV. LITHOGRAPHIC IMAGETRANSFER (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	G. Operating the Offset Lithography Duplicator/ Press			
attach and securely fasten a prepared plate (image carrier) to the plate cylinder of the duplicator/press.	1. Attaching and securing the plate (image carrier)	Get or prepare a lithographic plate. Set the machine up and practice running the duplicator press. Make all necessary adjustments and reproduce the job.	Secure all supplies and tools necessary for the demonstration of the press. Organize the chemicals, ink, wiping pads, and other supplies.	Book 5, p. 334
perform the necessary steps required for starting the duplicator/press and printing a few sheets of paper.	2. Starting the duplicator/press a. Wipe down the plate b. Turn on the power c. Lower the dampening roller d. Lower the inking roller e. Begin the paper feed			
	3. Stopping the duplicator/press a. Turn off the paper feed b. Raise the ink rollers c. Raise the dampening roller d. Turn off the power			
analyze the printed sheets to determine the necessary vertical, horizontal, and diagonal adjustments that are necessary to achieve proper printing position.	4. Printing position adjustments a. Vertical b. Horizontal c. Diagonal			

UNIT XIV. LITHOGRAPHIC IMAGE TRANSFER (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
determine and accomplish the necessary adjustments to the feeding systems. make necessary adjustments appropriate to the feeding system. analyze inking system adjustments and position all ink rollers properly. analyze the dampening system adjustment and position all dampening rollers properly. perform the required adjustments and settings among the plate, blanket, and impression cylinders. install a blanket on the cylinder according to the guidelines presented in this unit.	H. Offset Lithography Duplicator/Press Adjustments 1. Feeding system adjustments a. Double-sheet eliminator b. Elevator control knob c. Printing speed 2. Delivery system adjustments a. Delivery rate lowering control b. Jogging guides 3. Inking system adjustments a. Form rollers b. Other ink rollers 4. Dampening system adjustments a. Form roller b. Oscillator roller c. Ductor roller 5. Cylinder system adjustments a. Plate-to-blanket impression b. Blanket-to-paper impression 6. Blanket installation a. Removal of old blanket b. Attachment to the blanket tail clamp	Read assignment. Answer questions at the end of chapter.	Obtain the various materials needed to make press adjustments. Also, have a new or reconditioned blanket available for attachment to the blanket cylinder.	Book 5, p. 336

UNIT XIV. LITHOGRAPHIC IMAGE TRANSFER (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	d. Securing the blanket			
diagnose the printing problems associated with operating an offset lithography duplicator/press.	I. Lithographic Printing Problems 1. Quality results a. How to recognize quality b. How to achieve quality 2. Printing problems a. How to diagnose a problem b. How to solve the problem		Keep a file of printed sheets that are less than desirable. Group them by specific problems to show to students.	Book 5, p. 341
remedy the printing problems as diagnosed.	3. Common printed sheet problems a. Scumming b. Dirty background c. Too dark d. Weak spots e. Non-image area filling f. Image breakdown while plate is running			Book 5, p. 341
thoroughly clean the dampening system of the offset lithography duplicator/press.	J. Cleaning the Offset Lithography Duplicator/Press 1. The dampening system 2. The inking system 3. The cylinder system 4. The total duplicator/press	At the termination of a press run, wash up the press and prepare it for extended shutdown.		Book 5, p. 343

UNIT XV. SCREEN PRINTING 12 Hours

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
The student should be able to:	XV. SCREEN PRINTING			
compare the screen printing graphic reproduction method with the other major reproduction methods of letterpress, lithography, and gravure.	A. Introduction to Screen Printing 1. Principle of operation 2. Different names for the process 3. Historical highlights 4. Products a. Two-dimensional b. Three-dimensional c. Cylindrical objects 5. The three categories of image carriers a. Knife-cut film b. Photographic c. Washout (tusche)	Collect as many products as possible that have been printed by the screen printing method.	Carefully inspect the quality of the images. What improvements could have been made? Use transparencies SP-1, SP-2, SP-3, SP-4, and SP-11. Show film "It's a Screen Printed World."	Book 5, p. 371 Book 6, pp. 10-11 Book 7, pp. 373-375 DCA Education Products Book 5, p. 373 Advance Process Supply Co., 400 N. Noble St., Chicago, IL 60622
name three basic methods used to prepare screen printing image carriers.	B. Industrial Equipment and Production Methods 1. The various screen principles a. Rotary screen b. Rocker-type machine c. Bottle-printing machine d. Flat-bed type machine			

UNIT XV. SCREEN PRINTING 12 Hours

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
name and briefly describe the four styles of screen process printing machines.	2. Printing machines for commercial use a. Hand-operated b. Flat bed c. Cylinder d. Rotary e. Specialty 3. Drying equipment a. Wood or metal drying racks b. Wicket dryers c. Drying ovens d. Continuous conveyor-belt dryers	Review literature from printing equipment manufacturers.	Write to several screen printing equipment manufacturers for literature. Have students review this literature to become aware of current commercial practices.	
list necessary screen printing equipment for hand production.	C. Screen Printing Equipment for Hand Production			Book 5, p. 378 Book 7, pp. 342-353
	1. Equipment for hand production a. Frame b. Screen fabric		Use transparencies SP-5, Sp-6, and Sp-7.	DCA Education Products
select the correct screen fabric for the kind of job that will be printed.				
select the squeegee that will serve the best purpose for the product being printed.	c. Squeegee d. Film-cutting tools e. Drying equipment			
	D. Safety with Screen Printing Equipment and Materials (Teach thorough safety lesson pertaining to equipment in your laboratory.)			Book 5, p. 382

UNIT XV. SCREEN PRINTING (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
construct a hand-operated screen printing unit, including the frame and base.	E. Building a Screen Printing Press 1. Frame construction a. Commonly used woods b. Screen and image size ratio c. Construction procedure 2. Base construction a. Commonly used materials b. Screen and image size ratio c. Construction procedure	Build a screen printing unit. Prepare a unit for flat materials or for cylindrical objects or for both.	Check for high-quality printing and maximum efficiency. Secure needed supplies (wood, hinges, screen fabric, cord, wing-nut bolts, and masking tape).	Book 5, p. 383
attach and properly secure the screen printing unit, including the frame and base.	3. Attaching the screen fabric a. Various methods possible b. Cutting the fabric to correct size c. Stretching and securing the fabric 4. Taping the frame		Use transparencies SP-8, Sp-9, and Sp-10.	DCA Education Products
select and/or prepare artwork appropriate for use with one or more of the several methods of producing a screen image carrier.	F. Artwork for Screen Printing 1. Hand-cut film 2. Direct photo-sensitive screens 3. Indirect photographic screen film	Produce artwork for a poster advertising an event in your school. Use handcut film method.	Obtain several art books or clippings. Allow students to browse through them. Use transparencies SP-16.	Book 5, p. 385 DCA Education Products

UNIT XV. SCREEN PRINTING (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	4. Paper stencil 5. Washout screens			
cut hand-prepared lacquer-soluble screen printing film.	G. Lacquer-Soluble Hand-Prepared Film 1. Description a. Securing the artwork b. Securing the lacquer film c. Cutting procedures d. Removing the film from image areas e. Replacing film if corrections are needed f. Safety--knives 2. Cutting the film a. Securing the artwork b. Securing the lacquer c. Cutting procedures d. Removing the film from image areas e. Replacing film if corrections are needed f. Safety--knives	Compare the several methods of preparing the screen printing image carriers. Select an illustration for a particular product and prepare as image carrier by each of the several methods.	Obtain necessary artwork, cutting tools, film adhering liquid, and cloths (also fabric preparation materials). Cut standard size film for students. Demonstrate cutting and mounting film. Use transparency SP-14.	DCA Educational Products

UNIT XV. SCREEN PRINTING (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
prepare the fabric using mechanical treatment and degreasing to accept the stencil.	3. Fabric preparation a. Mechanical treatment b. Degreasing			
adhere lacquer-soluble hand-prepared film to the screen fabric.	4. Adhering the film a. Preparing the screen b. Lacquer film placement c. Applying the adhering liquid d. Absorbing the excess adhering liquid e. Removing the backing sheet f. Safety--ventilation and fire			
	H. Water Soluble Hand Prepared Film	Repeat the same activity for water-soluble hand-prepared film as lacquer-soluble hand-prepared.	Repeat the same process as lacquer-soluble hand-prepared film.	Book 5, p. 391 Book 7, pp. 351-352
cut hand-prepared water-soluble screen printing film.	1. Description 2. Cutting the film a. Securing the artwork b. Securing the water-soluble film c. Cutting procedures d. Removing the film from image areas e. Replacing film if corrections are needed		Use transparency SP-14.	DCA Educational Products

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	REFERENCES
	f. Safety--knives 3. Fabric preparation 4. Adhering the film a. Preparing the screen b. Water-soluble film placement c. Applying the adhering liquid d. Absorbing the excess adhering liquid e. Removing the backing sheet f. Safety--ventilation			
adhere water-soluble hand-prepared film to the screen fabric.				
remove water-soluble film from the screen following the printing operation.	5. Removing the film from the screen a. Preparation and supplies needed b. Dissolving the water-soluble film c. Safety--ventilation and fire			
explain the purpose of masking the non-printing areas of the screen.	I. Masking the Non-Printing Areas 1. The purpose of screen masking	Have students mask their own screen.	Demonstrate masking the screen. Show students the procedure involved in liquid masking using the brush and the paperboard squeegee.	Book 5, p. 452 Book 7, pp. 363-364
perform the screen masking operations of top-paper masking, bottom-paper masking, liquid masking, and tape masking.	2. Paper masking a. Top-paper masking b. Bottom-paper masking 3. Liquid masking a. Brush applied b. Squeegee applied 4. Tape masking		Transparency SP-23.	DCA Educational Products

UNIT XV. SCREEN PRINTING (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
select the appropriate ink for the product being printed.	J. The Screen Printing Operation 1. Screen printing ink a. Water-base b. Oil-base c. Synthetic enamel d. Lacquer-base e. Special formulations	Read and define the key terms and answer the study questions at the end of the chapter.	Provide sufficient colors of ink in various kinds for screen printing. Get a supply of small containers to mix and hold ink.	Book 5, p. 404
accomplish the screen printing operation according to the procedures outlined in this unit.	2. Printing procedure a. Attaching the frame to the base b. Securing the paper guides c. Applying the ink d. Pulling the squeegee e. Making the flood stroke f. Removing the printed copy g. Printing multiple copies 3. Printing on special materials a. Thick, flat objects b. Cylindrical objects		Use transparencies SP-25, SP-26, and SP-27.	DCA Educational Products Book 7, p. 373

UNIT XV. SCREEN PRINTING (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
prepare and print copies, using the stencil method of screen printing. prepare and print copies, using the washout method of preparing the screen.	K. Paper Stencil and Washout Screens 1. The paper stencil a. Preparation of the stencil b. Printing with the stencil c. Cleanup procedures 2. The washout screen a. Selection/ preparation of the copy b. Filling in the image area c. Masking the non-printing area d. Removing the liquid tusche e. The printing operation f. Cleaning the screen	Using artwork make copy using the stencil and washout methods.	Use transparencies SP-12 and SP-13. Obtain necessary materials for stencil and washout screen preparation and printing. Demonstrate the stencil image carrier method and the washout screen method.	DCA Educational Products Book 5, p. 409

UNIT XVI. FINISHING AND BINDING 10 Hours

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
The student should be able to:	XVI. FINISHING AND BINDING	Visit a commercial bookbinding plant. Notice the methods of binding and procedures by which each commercial plant operates it bindery.	Find examples of early bound books. Possibly you can make a scroll or clay tablet for visual aids. You may take your class to the early book collection in the public library.	
tell the purpose of finishing and binding.	A. Introduction to Finishing and Binding 1. Purpose of finishing and binding 2. Historical development			Book 5, p. 463 Book 7, p. 511-528 Book 5, p. 464
	B. Safety in Finishing and Binding (Teach thorough safety lesson pertaining to all finishing and binding equipment in your laboratory.)		Review safety which applies to all finishing and binding equipment.	
describe the following ten finishing operations: cutting, folding, scoring, perforating, gathering, punching, drilling, die-cutting, hot-stamping, and laminating.	C. Finishing Methods 1. Cutting and trimming 2. Folding 3. Scoring 4. Perforating 5. Gathering 6. Collating 7. Punching and drilling 8. Die-cutting 9. Hot stamping 10. Laminating		Establish a file of samples of the various finishing methods. Use these during a class demonstration or display.	Book 5, p. 465
	D. Paper Cutting 1. Safety 2. Planning for cutting a. Determining needed press sheets b. Determining the number of stock sheets		Review safety on paper cutter.	Book 5, p. 471

UNIT XVI. FINISHING AND BINDING (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
prepare a cutting chart and determine the number of needed stock sheets based upon predetermined number of press sheets.	c. Making a cutting chart 3. The power paper cutter parts and purposes a. Table b. Backgauge c. Backgauge handwheel d. Backgauge indicator e. Clamp f. Clamp control g. Cutting stick h. Knife i. Knife control buttons j. Light switch k. Power switch l. Pressure gauge m. and controls	Identify the parts of the paper cutter in the laboratory. Demonstrate skill in its use.	Demonstrate the procedure to determine the number of press sheets needed to end up with the required number of printed finished sheets and the number of stock sheets necessary to cut for the required press sheets.	
accurately and safely use the paper cutter to cut press sheets from stock sheets.	4. Paper-cutter operations a. Backgauge adjustment b. Positioning the paper c. Clamping the paper d. Cutting the paper e. Removing the cut paper and/or trimmings			

UNIT XVI. FINISHING AND BINDING (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
state the purpose of binding sheets of paper together in book form. identify the twelve specific methods of binding sheets of paper together.	E. Basic Binding Methods 1. Mechanical binding methods a. Spiral wire b. Plastic cylinder 2. Loose-leaf bindings a. Ring binder b. Post binding c. Base-and-prong d. Friction 3. Wire staple binding a. Saddle-wire b. Side wire 4. Perfect binding 5. Sewn bindings--soft or hard cover a. Saddle sewing b. Flat sewing c. Signature to signature sewing	Choose one of the basic methods of binding and a give a demonstration to the class. Prepare a report on what was seen at the bookbinding plant.	Use transparencies GA-30, GA-31, GA-32, and GA-33. Obtain one or more examples of each twelve binding methods for display purposes. Visit a commercial bookbinding plant.	DCA Educational Products Book 5, p. 475 Book 7, p. 4
	F. Soft-Cover Binding Procedures 1. Plastic-cylinder binding a. Materials needed b. Operating the bar cutter or broad shears c. Fastening the binder's board to the binding cloth	As a class project, plan and produce 25 copies of a booklet. Use either the side-wire or saddle-wire method of binding.	For demonstration purposes bind one or more books using plastic-cylinder binding, post binding (loose leaf), saddle-wire stitching, side-wire stitching, and padding methods.	Book 5, p. 478 Book 5, p. 479

UNIT XVI. FINISHING AND BINDING (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	d. Constructing the library corner e. Constructing the nicked corner f. Operating the hot-stamping press g. Punching holes h. Assembling the book			
	3. Saddle-wire stitching a. Materials needed b. Folding the sheets by hand or with a paper folder c. Gathering the signatures d. Operating the power stitcher e. Trimming the booklets			Book 5, p. 481
	4. Side wire stitching a. Materials needed b. Gathering the sheets or signature c. Operating the side-wire stitching machine d. Applying the book cloth to the backbone e. Trimming the book			

UNIT XVI. FINISHING AND BINDING (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	5. Padding a. Materials needed b. Gathering the sheets c. Applying the adhesive d. Applying the adhesive e. Trimming the pads			Book 5, p. 483

UNIT XVII. PULP AND PAPER MANUFACTURING 5 HOURS

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
The student should be able to:	XVII. PULP AND PAPER MANUFACTURING			
summarize historical highlight of paper.	A. Introduction to Pulp and Paper Manufacturing 1. The paper manufacturing industry 2. Paper products 3. Historical highlights 4. Paper and raw materials	Visit a paper mill. List ten or more paper products, other than the common sheet, that are used for printing purposes.	Arrange a field trip to a local paper mill to observe paper manufacturing.	Book 4, p. 266 Book 5, p. 501
list the basic ingredients needed to produce paper.				
list the major sources of wood which are used for paper pulp.	B. Pulp Manufacturing 1. Pulpwood a. Kinds of trees b. Transportation and handling	Write a short paper on the tree farm system.	Obtain samples of paper products.	Book 5, p. 504
name and describe the stages of debarking, chipping and pulping.	2. Debarking 3. Chipping 4. Pulping 5. Bleaching 6. Beating and refining	Summarize the total process of forming the sheet of paper once the pulp reaches the papermaking machine.	Discuss recycling.	
list the three principal methods of manufacturing paper and paperboard.	C. Paper Manufacturing 1. Methods of manufacturing a. The fourdrinier b. The cylinder c. The inverform		Show film "Paper--The Messenger of Mankind."	Hammermill Paper Co. Erie, PA Book 5, p. 510
summarize the total process of forming the sheet of paper once the pulp reaches the papermaking machine.	2. Forming the paper			

UNIT XVII. PULP AND PAPER MANUFACTURING (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
identify and explain the two methods of producing watermarks.	3. Adding the watermark 4. Water removal and drying 5. Finishing a. Inspecting b. Sheeting c. Special finishing d. Packing			
clarify the terms "weights" and "sizes" in relationship to paper as used for printing purposes.	D. Kinds, Weights, and Size of Paper	Compute the weight and sizes of these examples according to the "Constant Factor Schedule" and the "MW System."	Obtain samples of each of the ten basic papers listed in this unit.	Book 5, p. 517 Book 7, pp. 485-487
compare the ten basic papers of bond, book, bristol, cover, ledger, offset, text, newsprint, duplicator, and mimeograph.	1. Printing paper classification a. Bond b. Book c. Bristol d. Cover e. Ledger f. Offset g. Text h. Newsprint i. Duplicator j. Mimeograph 2. Basic weights and sizes of paper 3. Recycled paper			
name the several methods of packaging paper for sale and shipment to the purchaser.	E. Buying and Finding Cost of Paper 1. Packaging methods for printing papers	Determine the package breaking point for specified papers according to the table listed in the text.	Obtain a pricing catalog from a paper supply company. Have students determine the costs of paper.	Book 5, p. 523

UNIT XVII. PULP AND PAPER MANUFACTURING (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
compute the cost of a specified kind, weight, and basic size of paper according to information found in a typical paper supply house pricing catalog.	2. Determining cost of paper	Determine the cost of paper according to the 1000-sheet system.		

UNIT XVIII. PRINTING INK 5 HOURS

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
The student should be able to:	XVIII. PRINTING INK			
briefly describe how ink is manufactured.	A. Ink Manfacture		Secure several kinds of ink to show students.	Book 5, p. 531
	B. Vehicles			
	1. Terms 2. Varnishes 3. Synthetic oils 4. Resins 5. Solvents			Book 5, p. 532
	C. Vehicle Drying	Perform assigned tests.	Have some standard ink tests prepared so each class member can perform the tests and write up the results.	Book 5,
	1. Absorption drying 2. Oxidation and polymerization 3. Resin-solvent drying 4. Moisture-set drying 5. Resin-oil drying 6. Cold-set drying			
recognize the ingredients used in making ink and how they influence the final product.	D. Pigment	Name the ingredients used in making ink and how they influence the final product.	Assemble a collection of printed jobs which use different types of inks. Notice the appearance of the ink and the material upon which the job was printed.	Book 7, pp. 195-196, 201 Book 5, p. 533
	1. Natural and synthetic organic pigments 2. Daylight fluorescent pigments 3. Permanency of pigments			Book 7, pp. 495-497
	E. Ink Compounds and Additives			

UNIT XVIII. PRINTING INK (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
select the proper ink for the job to be printed.	F. Characteristics of Inks for Different Printing Papers 1. Letterpress 2. Lithography 3. Gravure 4. Screen	Mix some inks to see different colors. Keep a record of the ingredients.		
recognize inking problems and know how to correct them.	G. Ink Problems 1. Setoff 2. Improper drying 3. Chalking 4. Sticking			Book 5, p. 537
	H. Ink Tests			
	I. Ordering Inks			
	J. Ink Care			

UNIT XIX. GRAPHIC ARTS CAREER OPPORTUNITIES 5 HOURS

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
The student should be able to:	XIX. GRAPHIC ARTS CAREER OPPORTUNITIES			Book 7, p. 23 Book 5, p. 555
summarize the opportunities and challenges available to students in the graphic arts industry.	A. Introduction to Careers in Graphic Arts 1. The graphic arts industry a. Its opportunities b. Its challenges	Write a short paper on career opportunities in the graphic arts industry.	Show film "Graphic Communications--We Used to Call it Printing."	E.I. Dupont DeNemours & Co., Inc. Advertising Dept. Motion Picture Dist. Wilmington, DE 19898
define the term "apprenticeship" and clarify the features of the apprenticeship program.	2. Qualifications a. Apprenticeship b. Journeyman c. How to achieve needed qualifications		Show slide tape "Ideas Won't Keep."	Eastman Kodak Co. Dept. 454 343 State St. Rochester, NY 14650
compare the earning and working conditions of production workers in the graphic arts industry to other manufacturing industries.	3. Earnings and working conditions a. The hourly pay b. The work-week length c. The stability of employment		Obtain career posters Obtain career booklets	Eastman Kodak Co. Graphic Arts Technical Foundation, Inc. 4615 Forbes Ave. Pittsburgh, PA 15213
name several of the specific opportunities that are available in the employment market of the graphic arts industry.	4. Employment outlook a. Today's opportunities b. Opportunities in 5 to 10 years c. Operating a personal business		Have local employment security officer give a presentation to the class on employment procedures and how to apply for a job.	International Graphic Arts Education Assoc., Inc. 4615 Forbes Ave. Pittsburgh, PA 15213
	B. Production Preparation 1. Design and layout a. The area of design origination b. People need artistic talent	Compare the advantages and disadvantages involved in employment in each of the preparation production areas.		Book 5, p. 557

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	c. Tasks performed 2. Composition a. The compositor-a talented person b. Training necessary 3. Photography a. Continuous-tone photography needs b. High-contrast photography needs 4. Image carriers a. People with a knowledge of chemistry b. New materials within this area		Show films "Photography Is" and "Worlds within Worlds" (Free).	Eastman Kodak Co.
	C. Production of Printed Materials 1. Image transfer a. The area by definition b. Personnel qualifications c. Working conditions d. Kinds and sizes of equipment available 2. Finishing and binding a. Finishing operations b. Personnel qualifications for the area	Read assignment and complete the activities related to this unit.	Look for the different sources of material in these two areas.	Book 5, p. 559

UNIT XIX. GRAPHIC ARTS CAREER OPPORTUNITIES (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	c. Binding operations d. Skills necessary for the binder			
assess their levels of interest in pursuing a career involving a specific area of graphic arts.	D. Management and Sales Opportunities			
	1. Management and sales personnel a. Essential ingredients of all business enterprises b. Must be specialist	Discuss orally the qualities people in sales and management must possess. Appraise these talents.	Have someone in one of these areas come and talk to your class.	Book 5, p. 560
	2. Management people a. Qualifications b. Complex work		Talk to school counselor about the availability of materials in the area of management and sales.	
	3. Sales personnel a. An area of many challenges b. Qualities of a good salesperson			
	E. Pulp and Paper Manufacturing Opportunities	Discuss the possible areas of employment for people having a degree in industrial, civil or mechanical engineering.		Book 5, p. 563
	1. Pulp and paper manufacturing opportunities a. Engineering b. Scientific areas c. Research areas d. Management, business and legal areas			

UNIT XIX. GRAPHIC ARTS CAREER OPPORTUNITIES (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	2. Opportunities within the plant operations a. Production workers b. Maintenance personnel c. Semi-skilled workers		Contact someone in management personnel and request a presentation to your class regarding career opportunities.	Book 5, p. 56.

UNIT XX. PHOTOGRAPHY OPTIONAL

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
The student should be able to:	XX. PHOTOGRAPHY			
express the importance of photography in the everyday lives of all people.	A. Introduction to Photography 1. Origin of photography 2. Uses of photography 3. Avocational and occupational implications of photography		Collect examples of photographic prints to display. Secure the items: camera, negatives and prints.	Book 4, pp. 12-16 Book 5, p. 415 Book 7, p. 97
distinguish by name, among several kinds of commonly available cameras.	B. The Camera 1. Simple camera a. Box camera b. Cartridge camera 2. Twin-lens reflex 3. Single-lens reflex camera 4. Press camera 5. View camera	Identify the different parts of the cameras.	Obtain several kinds of cameras (box, twin-lens reflex, 35mm, single-lens reflex, press and view).	Book 5, p. 416 Book 7, p. 96
identify different kinds of film and describe the characteristics of each.	C. Photographic Films 1. Kinds of film 2. Structure of film 3. Latent image 4. Film speeds 5. Grain 6. Film sizes	Make a portfolio to be turned in at the end of this unit. Include one picture in each of the following categories: people working, people at play, an activity involving a sequence of events, an historical landmark, a relative, an animal, time-exposure, nature, and an architectural structure.	Secure enough film to illustrate how to load the film in the camera and to demonstrate the different ASA's and sizes.	Book 5, p. 420
properly load film into camera.	7. Loading film			
explain the importance of light in achieving a good exposure.	D. Making the Exposure 1. Image areas of photograph			

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	a. Highlights b. Shadows c. Middletones 2. Film speeds a. ASA b. Fast c. Medium d. Slow		Provide several examples of film with ASA speeds (slow, medium, fast).	Book 7, pp. 55-[illegible]
identify and explain common apertures and how they are adjusted to achieve good exposures and predict depth of field.	3. Apertures a. Sizes--f/numbers b. Depth of field (Depth of focus)			
name common shutter speeds and show the relationship between apertures to achieve proper exposure.	4. Shutter speeds a. Range of speeds b. Influence on motion		Explain the relationship between shutter speed and motion. Show examples of stop-action photography.	
explain the purpose of light measurement.	5. Light a. Natural b. Artificial c. Natural light measurement with a meter		Provide a hand-held light meter and demonstrate how it works. Also discuss how the meter averages the available light. Demonstrate how to hold the camera.	
develop film using the tank method.	E. Film Processing 1. Latent image a. Exposed silver halides b. Becomes visible upon development 2. Developing film a. Developer b. Stop-bath c. Fixers d. Wash	With exposed film, practice rolling the film on the spool. Set trays in their correct location.		Book 5, p. 423

UNIT XX. PHOTOGRAPHY (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	3. Developing film a. Done in total darkness (1) Tray Development (2) Tank Development b. Equipment (1) Tanks (2) Thermometer (3) Graduate (4) Funnel (5) Timer 4. Loading roll film 5. Processing film a. Follow manufacturer recommendations b. Primary factors (1) Development time (2) Chemical Temperature (3) Agitation c. Procedure	Develop a roll of black and white film.	Demonstrate the correct procedures for tank and tray developments.	
identify various kinds of photographic papers and describe the characteristics of each. select the appropriate kind of paper to enhance the photographic print.	F. Photographic Papers 1. Bases 2. Emulsions 3. Paper finishes	Choose what paper is right for your portfolio. Check with the instructor.	Provide paper of different weights, emulsion, and finishes.	Book 5, p. 433
identify appropriate equipment and materials needed for making contact and projection print.	G. Photographic Printing 1. Contact printing			

UNIT XX. PHOTOGRAPHY (Continued)

OBJECTIVES	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	2. Contact printing a. Printing frame b. Contact printer 3. Making the contact print	Make a contact sheet and select the best frames for prints.	Collect and prepare materials necessary for making the contact and projection prints.	Book 5, p. 435
describe the principles and concepts underlying contact and projection printing.	4. Principles of projection 5. Enlargers (a) Light source (b) Negative carrier (c) Lens (d) Base		Demonstrate how to use the enlarger (the F/stops and the timer).	
make contact and projection prints.	6. Making projection print	Make prints for portfolio.	Provide paper for prints.	Book 5, p. 443
identify photographic paper that will yield the desired finish on the photograph.	H. Finishing and Mounting Prints 1. Purpose of finishing	Finish your prints and mount prints on a mounting board using dry mounting tissue. Place all prints in a portfolio and turn in to your instructor.		
dry photographs, using the correct procedure to obtain the proper finish on the print.	2. Drying			
mount prints on mounting board using dry mounting tissue.	3. Mounting photographs		Provide mounting materials. Demonstrate	
		Turn in portfolio.		

APPENDIX

AUDIOVISUAL SOURCES

TRANSPARENCIES

Graphic-Arts Transparencies
GA-1 through GA-95
Screen Printing Transparencies
SP-1 through SP-28
DCA Educational Products
424 Valley Road
Warrington, PA 18976

16 mm FILMS

"Blue Sky Thinking
Ulano, Inc
610 Dean Street
Brooklyn, New York 11238

"Graphic Communications--
We Used to Call it Printing"
E. I. Dupont De Nemours & Co., Inc.
Advertising Department
Motion Picture Distribution
Wilmington, Delaware 19898

Graphic Arts Technical Foundation, Inc.
4615 Forbes Avenue
Pittsburgh, PA 15213

"Gutenberg"
Heidelberg, U.S.A.
73-45 Woodhaven Boulevard
Glendale, New York 11385

"It's a Screen Printed World"
Advance Process Supply Company
400 North Noble Street
Chicago, Illinois 60622

"Messages"
Typographic International Association
2266 Hall Place, N. W.
Washington, DS 20007

"Paper--The Messenger of Mankind"
Hammermill Paper Company
Educational Services
Advertising Department
Erie, PA 16512

"Printing-Platen Press Makeready"
International Film Bureau, Inc
332 South Michigan Avenue
Chicago, Illinois 60600

"The Colonial Printer"
Contemporary Films, McGraw-Hill Films
Midwestern Office
828 Custer Avenue
Evanston, Illinois 60202

"The Alphabet--The Mark of Man"
Contemporary Films, McGraw-Hill Films
Midwestern Office
828 Custer Avenue
Evanston, Illinois 60202

SLIDES-TAPES

"Ideas Won't Keep"
"Photography Is"
"Worlds Within Worlds"
Eastman-Kodak Company
Department 454
343 State Street
Rochester, New York 14650

"The Wonderful World of Typography"
"Typography Today"
Typographic International Association
2266 Hall Place, N.W
Washington, DC 20007

CHARTS-KITS

Metric System (Chart)
United States Printing Office
Division of Public Documents
Washington, D.D. 20402

PAPERMAKING KITS

American Paper Institute
260 Madison Avenue
New York, New York 10016

Hammermill Paper Company
Educational Services
Advertising Department
Erie, PA 16512

CAREER AND INFORMATION SOURCES

American Paper Institute
260 Madison Avenue
New York, New York 10016

Graphic Arts Technical Foundation, Inc.
4615 Forbes Avenue
Pittsburgh, PA 15213

International Graphic Arts Education
Association, Inc.
4615 Forbes Avenue
Pittsburgh, PA 15213

Typographic International Association
2266 Hall Place, N.W.
Washington, D.C. 20250

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